
NOTICE OF INTRUSIVE ACTIVITY

for

FORMER BROOKLYN BOROUGH (CONEY ISLAND) GAS WORKS SITE

2731 West 12th Street
Block 7247, Lot 106
Brooklyn, New York 11223

Prepared For:

Prologis, L.P.
Pier 1, Bay 1
San Francisco, CA 94111

Prepared By:

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
368 Ninth Avenue, 8th Floor
New York, New York 10001



Elizabeth Adkins, PE
Senior Project Engineer



Jason Hayes, PE
Principal

LANGAN

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1.0 INTRODUCTION

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) prepared this Notice of Intrusive Activity as a formal notification for the proposed redevelopment of a portion of the Former Brooklyn Borough (Coney Island) Gas Works Site located in Brooklyn, New York (the remediation site), which has been remediated to the satisfaction of the New York State Department of Environmental Conservation (NYSDEC). The remediation site is registered in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program as Site No. 224026. Brooklyn Union (hereinafter referred to as “National Grid”) entered an Order on Consent, Index #D2-001-94-12, on 12 May 1995, with the NYSDEC to remediate Manufactured Gas Plant (MGP)-related impacts at the remediation site (the Order).

The remediation site is comprised of Block 7247, Lots 13, 106, and 218 on the Brooklyn Borough Tax Map. Lot 106 is currently owned by 2731 W 12th Street LLC (W12th Street Owner), and Lots 13 and 218 are currently owned by the New York City (NYC) Department of Sanitation (NYC Sanitation; collectively, with W12th Street Owner, the Property Owners). This notification is being delivered on behalf of W12th Street Owner.

In March 2001, the NYSDEC issued a Record of Decision (ROD) for the remediation of the upland portion of the remediation site, designated as Operable Unit 1 (OU-1). In March 2002, the NYSDEC issued a ROD for the remediation of Coney Island Creek, designated Operable Unit 2 (OU-2). A portion of the remedial work for OU-1, including installing a sealed-seam sheet pile barrier wall and piezometers around the perimeter of the sheet pile wall, was completed between November 2003 and April 2004. Based on the phasing of the remediation, the construction of the sheet pile barrier wall was prioritized over the other remedial elements of OU-1; and as such, the remaining OU-1 remedial elements were designated as Operable Unit 3 (OU-3). The remaining remedial work for OU-2 and OU-3 was completed between January 2007 and October 2008.

As documented in the April 2013 Final Engineering Report (FER), the remediation site is subject to ongoing environmental requirements outlined in an Environmental Notice, Site Management Plan (SMP), and Excavation Work Plan (EWP) due to remaining MGP-related impacts in soil, sediment, and groundwater. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) performed a limited Phase II Environmental Site Investigation (ESI) across the remediation site in September 2022. Remaining impacts, including petroleum-, MGP-, and solvent-like odors; black staining; coal tar; and a sheen were apparent in soil samples collected from across the site between 3 and 16 feet below grade surface (bgs), and are anticipated to be encountered during redevelopment of a portion of the site. A copy of Langan’s 6 November 2023 Phase II ESI Report is included as Attachment 1. Two subsurface profiles showing MGP-related impacts (e.g., sheen, staining, odors, coal tar-like material) observed in soil borings during the Phase II ESI are included as Attachment 2.

Lot 106 is about 16.8 acres in area, is currently owned by 2731 W 12th Street LLC, and is proposed for redevelopment. The proposed redevelopment will include constructing a parking lot designed for fleet vehicle storage with electric vehicle charging stations. The redevelopment project will result in disturbance of the previously constructed low-permeability multi-component environmental cap (LPMEC or engineered cap), and underlying impacted material within an

approximately 466,115-square-foot portion of the site. All work that will result in disturbance of the LPMEC and underlying impacted material will be completed in accordance with the NYSDEC-approved 10 June 2019 SMP, Revision No. 4 (the "SMP"), and its appended EWP, as well as the other requirements specified in this Notice of Intrusive Activity (NOIA). Should revisions to the existing SMP be submitted to and approved by the NYSDEC, the revised SMP will take precedence over the 10 June 2019 SMP.

Please note that the redevelopment activities proposed under this notification are specifically for Block 7247, Lot 106 (hereinafter referred to as the "Site"); construction is not proposed on Lots 13 or 218, which comprise the balance of the remediation site No. 224026.

2.0 Proposed Redevelopment Project

Based on the 3 September 2024 Site Plans prepared by Langan, the latest development scheme consists of installing an asphalt-paved parking lot for fleet vehicle storage with electric charging stations. The parking lot will occupy approximately 466,115 square feet of the site footprint. Where hardscape is not installed, the engineered cap will be restored in a manner that complies with the SMP (See Section 2.11). A Site Location Map and Site Plan are included in Attachment 3.

The redevelopment project will include regrading the engineered cap and underlying impacted fill to achieve development grade; excavation and trenching for the installation of sub-grade drainage infrastructure, utilities, and foundation elements; off-site disposal of disturbed impacted soil/fill; restoration of the engineered cap; and import of soil/fill in accordance with the sampling and analytical requirements of the SMP, EWP, and Quality Assurance Project Plan (QAPP) for engineered cap restoration. The above-detailed earthwork areas, including drainage, utility, and electrical conduit trench areas, are shown on Attachment 4.

As indicated in the Site Plans, about 6.26 acres of tidal wetland adjacent area (TWAA) will be disturbed as part of this redevelopment project. Disturbance of Coney Island Creek (OU-2) is not expected as part of the redevelopment. A joint permit application for the work within the TWAA will be submitted at least 90 days prior to the start of the redevelopment project.

According to the 26 January 2024 ALTA/NSPS Land Title Survey prepared by Langan, the site elevations vary between -2.0 feet and 17 feet relative to the North American Vertical Datum of 1988 (NAVD88). The site slopes from the north-central portion generally to the south, towards Coney Island Creek.

Within the proposed asphalt-paved fleet vehicle storage areas, all regraded material will be placed beneath the proposed asphalt surface, which will act as an alternative cover system. As detailed in the EWP, when the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining impacted soil. The alternative surface cover will consist of a 2-inch-thick asphalt surface cover underlain by a 4-inch-thick base course, 10 inches of NYSDEC-approved crushed stone, and a geotextile demarcation layer (See Attachment 5, C-502, Detail 1). A geotextile demarcation layer will also be installed in excavated and trenched areas where drainage and utility infrastructure are to be installed (See Attachment 5, C-506). Bioretention basins are proposed to be installed along the southwestern and northeastern perimeters of the asphalt-paved areas and will be underlain by an impermeable high-density polyethylene liner (See Attachment 5, C-504, Detail 1). In areas where hardscape will not be installed, the engineered cap will be restored to consist of at least 12 inches of NYSDEC-approved topsoil or clean backfill, a geosynthetic clay liner (GCL), a gravel venting layer (12-inches of stone), and three layers of geotextile fabric overlying remaining impacted soil (See Attachment 5, C-506, Detail 5).

While the export of significant quantities of impacted fill is not anticipated, some off-site disposal is anticipated and will be performed in compliance with the requirements of the SMP, EWP and this NOIA. All excavated material that will not be placed as backfill under the engineered cap or alternative cover system will be stockpiled, characterized in accordance with disposal facility

requirements, and disposed of off-site at a National Grid- and NYSDEC-approved facility permitted to accept the material in accordance with the EWP. All material will be handled in accordance with the SMP, EWP, and this NOIA.

Any stockpiles generated during redevelopment will be placed within specified stockpile staging areas and constructed in accordance with the SMP, EWP and this NOIA. All imported fill will be approved by National Grid's Qualified Environmental Professional (QEP) and the NYSDEC prior to receipt at the Site and (if necessary) stockpiled on and covered with a minimum 10-mil layer of polyethylene sheeting prior to use in accordance with the SMP, EWP, QAPP, and this NOIA, as discussed in further detail below.

Following completion of the redevelopment project, all equipment will be decontaminated prior to demobilization from the Site in accordance with the SMP, EWP, and this NOIA.

2.1 Schedule and Reporting

The redevelopment project is anticipated to take place from September 2025 through August 2026; however, the schedule will be confirmed with National Grid and the NYSDEC at least 60 days in advance, per the EWP.¹ Redevelopment progress and oversight activities will be presented in daily reports as indicated below. Additionally, an updated SMP to reflect changes to the cover system will be prepared for submission to the NYSDEC following completion of intrusive activities and Site cover restoration.

¹ The NYSDEC was previously notified of the proposed intrusive activities on 12 June 2024, and determined the proposed work to be in accordance with the EWP and required a 60-day notice prior to the start of excavation.

3.0 Conformance of the Proposed Redevelopment Project with SMP/EWP Requirements

Based on the requirements of the SMP, EWP, and QAPP, as well as this NOIA, the following soil handling and Site restoration procedures will be completed for the disturbance of the engineered cap (an engineering control [EC]) and underlying soil impacts at the Site.

3.1 Notification

At least 60 days prior to the start of excavation that is anticipated to breach or alter the Site's engineered cap, the W12th Street Owner/operator or their representative will notify the NYSDEC contacts (provided in the table below) in writing, with copy to National Grid. The W12th Street Owner/operator will also provide a 60-day notice to National Grid for the intrusive work pursuant to the EWP to review and comment on the planned work. This NOIA shall serve as the required notification and work plan for ground-intrusive activities to both National Grid and NYSDEC. All notifications regarding this NOIA and schedule updates will be provided to the below National Grid, NYSDEC, and New York State Department of Health (NYSDOH) contacts:

Oliver Wolfe NYSDEC Project Manager	(518) 402-9732 Oliver.Wolfe@dec.ny.gov
Kiera Thompson Project Manager's Supervisor	(518) 402-9662 Kiera.Thompson@dec.ny.gov
Kelly Lewandowski Chief, NYSDEC Site Control	(518) 402-9569 Kelly.Lewandowski@dec.ny.gov
Michael Quinlan National Grid Project Manager	(516) 220-4363 Michael.Quinlan@nationalgrid.com
Kari Pollard NYSDOH Project Manager	(518) 486-1443 Beei@health.ny.gov

3.2 Mobilization

Prior to commencing the redevelopment project, the contractor will mobilize to the Site. Mobilization and Site preparation will include the following:

- Identifying the location of aboveground and underground utilities (e.g., power, gas, water, sewer, communications), equipment, and structures (as necessary to implement construction related to redevelopment);
- Mobilizing necessary construction personnel, equipment, and materials to the Site;
- Constructing one or more stabilized construction entrances consisting of non-hazardous material capped with a gravel roadway at or near the Site exit, which takes into consideration the Site setting and Site perimeter;
- Constructing an equipment decontamination pad for trucks, equipment, and personnel that come into contact with impacted materials during redevelopment activities;

- Installing erosion and sedimentation control measures, as necessary; and
- Installing temporary fencing or other temporary barriers to limit unauthorized access to the Site.

3.2.1 Equipment and Material Staging

During mobilization, construction equipment will be delivered to the Site, temporary facilities will be constructed, and temporary utilities will be installed. The contractor will place and maintain temporary toilet facilities within the work areas for use by all Site personnel. The contractor will provide drinking water for all Site personnel.

3.2.2 Site Fencing

The Site perimeter will be secured with gated fencing that includes project signage. The purpose of the fencing is to limit Site access to authorized personnel, protect pedestrians from Site activities and impacted soil/fill that may be exposed during redevelopment, and maintain Site security.

During redevelopment, signs will be displayed at the site entrance detailing the proposed work. Signage will follow the NYSDEC specifications for design and content.

3.2.3 Erosion and Sedimentation Controls

Erosion and sediment controls for the Site will be designed and documented in a Stormwater Pollution Prevention Plan (SWPPP) in conformance with requirements presented in the NYS Standards and Specifications for Erosion and Sediment Control. A SWPPP was prepared in accordance with all applicable requirements of the NYSDEC State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity. Since the stormwater runoff will discharge directly to the Coney Island Creek, the SWPPP was submitted to the NYSDEC for review and approval. The 20 December 2024 SWPPP and a NYSDEC Acknowledgement of a Notice of Intent (NOI) are included as Attachment 6. Best Management Practices (BMP) will be employed to mitigate erosion and prevent the migration of sediment off-site throughout redevelopment. Limited localized dewatering may be required during construction of drainage structures and will be performed as discussed in Section 2.10. Discharge of water generated during redevelopment to surface waters (e.g., Coney Island Creek) is prohibited without a SPDES permit. The NOI and SWPPP were filed with the NYSDEC for permit coverage under the SPDES General Permitting program.

3.2.4 Utility Marker and Easements Layout

The W12th Street Owner and its contractor are responsible for safe execution of all intrusive and other work performed during redevelopment. The W12th Street Owner and its contractors must obtain any local, state, or federal permits or approvals pertinent to such work that may be required during redevelopment. A Site utility stakeout will be completed for all utilities prior to any ground-intrusive activities at the Site. The contractor will contact the appropriate utility mark-out authority and make available to their staff the verification number and effective dates. Langan will record the verification number and effective dates from the contractor. Langan will note the location of

the marked-out utilities on the Site plan, review the contractor work plans, and provide environmental oversight during invasive work to ensure compliance with environmental requirements in the SMP and EWP on behalf of the W12th Street Owner.

3.2.5 Temporary Gravel Construction Egress Point(s)

A temporary gravel construction entrance and exit will be installed on-site at locations that align with the NYS Department of Transportation (NYSDOT)-approved truck transport route provided as Figure 13 of the SMP. The entrances will be covered with NYSDEC-approved gravel or recycled concrete aggregate, and truck wash waters will be collected for off-site disposal in accordance with the EWP. Egress points for truck and equipment transport from the Site will be kept clean of Site soil and other materials during Site redevelopment.

3.3 Excavation and Screening Methods

3.3.1 Approximate Excavation Extents

Disturbance of remaining impacted soil/fill is anticipated during regrading and excavation for the installation of drainage infrastructure and utilities. Excavation will extend from about 0.5 to 10 feet below existing grade surface.

A figure showing the proposed excavation extents is provided as Attachment 7.

3.3.2 Preliminary Waste Characterization Study

A waste characterization study will be performed for soil/fill intended for off-site disposal in a manner acceptable to the receiving facilities and in conformance with applicable permits. Waste characterization will be performed prior to invasive redevelopment work to characterize the soil/fill using suitable sampling parameters established by the disposal facility. All excavated material that will not be placed as backfill under the engineered environmental cap or alternative cover system will be stockpiled, characterized in accordance with disposal facility requirements, and disposed of off-site at a National Grid- and NYSDEC-approved facility permitted to accept the material in accordance with the EWP. A list of National Grid-approved facilities is provided as Attachment 8. Waste characterization data will be issued by the laboratory as a Category A deliverable and will not require a Data Usability Summary Report (DUSR). The waste characterization report will be provided to the NYSDEC for record.

3.3.3 Soil Screening

Langan field personnel will monitor ground-intrusive work that will result in disturbance of the EC and impacted soil/fill. Visual, olfactory, and instrument-based (e.g., photoionization detector [PID]) soil screening methods will be used during all invasive work.

Based on previous environmental data and screening results, soil will be segregated into material above the GCL (topsoil and clean backfill) that does not require special handling (described below in Section 2.4.1), material that requires off-site disposal, and material proposed for on-site reuse that requires testing prior to on-site reuse. Soil screening will be performed regardless of the time of year that invasive work is conducted and will be conducted (during working hours for the

redevelopment project, not continuously) beginning with the initiation of ground disturbance and will continue until either a satisfactory temporary Site cap has been established, until the permanent cover system has been constructed and/or all proposed Site work that will result in disturbance of the impacted fill is complete.

3.4 Soil Staging Methods

During construction activities, all stockpiling will be conducted in accordance with the SMP, EWP, and this NOIA to separate and stage excavated material pending on-site reuse, characterization sampling, or loading for off-site disposal. Temporary stockpiles will be constructed, as necessary, on-site to separate and stage excavated material based on the soil/material type and proposed use.

Stockpile areas will meet the following minimum requirements:

- Excavated material will be placed plastic sheeting with a minimum thickness of 10 mils.
- Soil stockpiles will be encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface water, and other discharge points.
- Stockpiles will be located and sized to minimize potential for material or run-off to enter discharge points.
- Stockpiles will be kept covered when not in use with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.
- Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC.

3.4.1 Topsoil and Clean Backfill

The existing cover system was initially constructed during site-wide remediation and, at the time, was comprised of a 38-inch-thick LPMEC consisting of 6 inches of topsoil, 20 inches of clean backfill, a GCL overlying a geotextile membrane, a gravel venting layer (12 inches of stone), and three layers of geotextile fabric overlying remaining impacted material. Per the SMP, the topsoil and clean backfill above the GCL do not require special handling requirements and can be reused and/or disposed of without National Grid or NYSDEC approval. Topsoil and clean backfill must be segregated during redevelopment to be reused on-site as general backfill to reach final development grades.

3.4.2 Impacted Material

Impacted soil/fill will be encountered during Site grading and excavation for utility installation. Based on the available data, contaminants in soil include volatile organic compounds (VOC); semivolatile organic compounds (SVOC), including polycyclic aromatic hydrocarbons (PAH); and metals. During Langan's September 2022 Phase II ESI, petroleum-, MGP-, and solvent-like odors; black staining; coal tar; and a sheen were apparent in soil samples collected from across the site

between 3 and 16 feet bgs. MGP- and petroleum-impacted soil is anticipated to be encountered during utility-related excavations within a portion of the site. Impacted soil will be stockpiled and segregated for characterization sampling and off-site disposal at a National Grid- and NYSDEC-approved disposal facility. Two subsurface profiles showing MGP-related impacts observed in soil borings during the Phase II ESI are included as Attachment 2.

3.4.3 Imported Material

Upon meeting the criteria identified in Section 2.9, NYSDEC-approved clean fill will be transported to the Site and segregated from impacted soil/fill and soil/fill proposed for on-site reuse. A Request to Import/Reuse Fill or Soil form, provided as Attachment 9 of this NOIA, will be prepared and submitted for review by National Grid and the NYSDEC for all material proposed for import. Approval by both the NYSDEC and National Grid will be required prior to import of clean fill to the Site.

3.5 Material Transport and Disposal Off-Site

3.5.1 Materials Load Out

Loaded vehicles leaving the Site will be appropriately lined, tarped with a solid (e.g., non-mesh) cover, securely covered, manifested, and placarded in accordance with appropriate federal, state, local, and NYSDOT requirements (and all other applicable transportation requirements). Loose-fitting mesh truck covers are prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

3.5.2 Transport

Transport of soil, fill, and any dewatering fluids that are not discharged to the New York City sewer system or surface water under applicable permits, will be performed by licensed haulers in accordance with appropriate federal, state, and local regulations, including Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 364. Haulers will be appropriately licensed and trucks properly placarded. All trucks loaded with Site soil and fill will exit the vicinity of the Site using only NYSDOT-approved truck routes, as shown on Figure 13 of the SMP.

These routes are the most appropriate routes to and from the Site and take into account:

- Limiting transport through residential areas and past sensitive sites
- Use of city mapped truck routes
- Prohibiting to the extent practical off-site queuing of trucks entering the facility
- Limiting total distance to major highways
- Promoting safety in access to highways
- Overall safety in transport
- Community input (where necessary)

Trucks will be prohibited from stopping and idling unnecessarily in the neighborhood outside the Site.

Egress points for truck and equipment transport from the Site will be kept clean of soil, fill and other materials during Site remediation and redevelopment.

Queuing of trucks will be performed on-site to the extent possible to minimize off-site disturbance. Off-site queuing will be prohibited to the extent practical.

3.5.3 Disposal

Excavated soil and fill that is segregated as material requiring off-site disposal will be treated as regulated material and will be transported and disposed of off-site at a permitted facility in accordance with all federal, state, and local regulations. If disposal of soil and fill from this Site is proposed for unregulated off-site disposal (i.e., clean soil removed for redevelopment purposes), a formal request with an associated plan will be made to the NYSDEC.

All excavated soil and fill intended for off-site disposal will be stockpiled, characterized in accordance with disposal facility requirements, and disposed of off-site at a National Grid- and NYSDEC-approved facility permitted to accept it in accordance with the EWP. Soil disposal facilities have not yet been determined. Off-site disposal locations for excavated soil/fill will be identified in a pre-excavation notification prepared by the W12th Street Owner/operator and provided to National Grid for review prior to submittal to the NYSDEC. This will include estimated quantities and a breakdown by class of disposal facility, if appropriate.

Non-hazardous fill and impacted soil taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Soil and fill that does not meet Unrestricted Use Soil Cleanup Objectives (SCO) is prohibited from being taken to a NYS construction and demolition debris recovery facility (6 NYCRR Subpart 360-5 registered or permitted facility).

An environmental professional under the supervision of a NYS-licensed Professional Engineer will document the load-out of excavated soil for off-site disposal. Soil transport and disposal documentation, including facility-countersigned disposal manifests, Part 364 transporter permits, and facility acceptance letters will be provided in the annual Periodic Review Report (PRR).

3.5.4 Truck Wash and Inspection Station

A truck wash will be operated on the Site, as appropriate. Outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in accordance with the SMP and EWP.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived soil and fill. Material accumulated from the street cleaning and egress cleaning activities will be disposed of off-site at a permitted disposal facility in accordance with all applicable federal, state, and local regulations.

3.6 Material Reuse On-Site

The soil/fill comprising the existing engineered cap and located above the GCL (topsoil and clean backfill) does not require special handling per the SMP. The material can be reused on-site or disposed of without National Grid or NYSDEC approval.

Material excavated from below the GCL that meets the Restricted Use Commercial (RUC) SCOs listed in Table 375-6.8(b) of 6 NYCRR Part 375 meet the criteria for on-site reuse. Prior to reuse, samples will be collected and analyzed by an Environmental Laboratory Approval Program-certified laboratory for:

- Total VOCs via United States Environmental Protection Agency (USEPA) Method 8260
- Total SVOCs via USEPA Method 8270C
- Polychlorinated biphenyls (PCB) via USEPA Method 8082/8082A/8080
- Total cyanide via USEPA Method 9010/9014
- Total Metals (Resource Conservation and Recovery Act metals, copper, nickel, zinc, vanadium, cyanide, and hexavalent chromium) via USEPA Method 6010B and 6010
- Total mercury via USEPA Method 7471
- Per- and polyfluoroalkyl substances (PFAS) via USEPA method 1633

The sampling frequency will be in accordance with Division of Environmental Remediation (DER)-10 Table 5.4(e)10 unless prior approval is obtained from NYSDEC for modification of the sampling frequency. The analytical results of soil/fill testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5, Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of PFAS (April 2023) guidance values. Approvals for modifications to the analytical parameters must be obtained from NYSDEC prior to the sampling event. A Request to Reuse Fill or Soil form, provided as Attachment 9 of this NOIA, will be prepared and submitted for review and approval by National Grid and the NYSDEC, allowing for a minimum of 5 business days for review. Approval by both the NYSDEC and National Grid will be required prior to on-site reuse of material, except for topsoil and clean fill above the GCL.

Impacted soil that is deemed unacceptable for on-site reuse will be transported off-site for disposal. Soil deemed acceptable for on-site reuse will be placed below the GCL or alternate cover system and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

3.7 Backfill from Off-Site Sources

All backfill proposed for import to the Site will be approved by National Grid's QEP and the NYSDEC and will be compliant with provisions in the EWP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, provided as Attachment 9 of this NOIA, will be prepared by the W12th Street Owner/operator and submitted for review by National Grid and the NYSDEC,

allowing a minimum of 5 business days for review. The form will include analytical sampling of the borrow source or existing documentation of agency source approval (e.g., NYSDOT virgin source certification and latest analytical sampling results). Approval by both the NYSDEC and National Grid will be required prior to material import to the Site. Material from industrial sites, spill sites, or other environmental remediation sites or potentially impacted sites will not be imported to the Site.

All imported soil will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for commercial use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 375-6.8(a) of 6 NYCRR Part 375. Soil that meets 'general' fill requirements under 6 NYCRR Part 360.13, but does not meet backfill or cover soil objectives for this Site, will not be imported to the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Samples will be collected from proposed imported fill in accordance with the analytical sampling requirements of DER-10 and the frequency requirements in NYSDEC's Soil Cleanup Guidance, Commissioner's Policy (CP)-51. At a minimum, samples will be analyzed for inorganics, pesticides, PCBs, VOCs, SVOCs, PFAS, and 1,4-dioxane in accordance with the analytes for the RUC SCOs listed in Table 375-6.8(a) of 6 NYCRR Part 375. The frequency and type of the sampling (e.g., discrete or composite) will be based on the quantity of material imported in accordance with Table 4 of CP-51.

Trucks entering the Site with imported soil will be securely covered with tight-fitting covers. Imported soil will be stockpiled separately from excavated material and covered to prevent dust releases.

3.8 Fluids Management

All impacted liquids to be removed from the Site, including but not limited to, excavation dewatering and decontamination water, will be handled, transported, and disposed of off-site at a permitted facility in accordance with applicable federal, state, and local regulations. Impacted liquids removed from the Site will be disposed of at a NYSDEC- and National Grid-approved disposal facility (See Attachment 8). Dewatering, purge, and redevelopment fluids will not be recharged back to the land surface or subsurface of the Site, and will be managed off-site, unless prior approval is obtained from the NYSDEC and the NYCDEP.

Discharge of water generated during redevelopment activities to surface waters (e.g., a local pond, stream, or river), if needed, will be performed under a SPDES permit.

3.9 Cover System Restoration

After the completion of soil removal and any other invasive activities, including utility installation, the cover system will be restored in a manner that complies with the SMP. The existing cover system was initially constructed during site-wide remediation and, at the time, consisted of a 38-inch-thick LPMEC consisting of 6 inches of topsoil, 20 inches of clean backfill, a GCL overlying a

geotextile membrane, a gravel venting layer (12 inches of stone), and three layers of geotextile fabric overlying remaining impacted soil.

Within the proposed asphalt-paved fleet vehicle storage areas, regraded material will be placed beneath the proposed asphalt surface, which will act as an alternative cover system. Regraded material will be sampled and submitted for review by National Grid and the NYSDEC prior to on-site reuse, unless it consists of topsoil and clean fill above the GCL. The alternative cover system will consist of a 2-inch-thick asphalt surface cover underlain by a 4-inch-thick base course, 10 inches of NYSDEC-approved crushed stone, and a geotextile demarcation layer. A geotextile demarcation layer will also be installed in excavated and trenched areas where drainage and utility infrastructure are to be installed (See Attachment 5, C-506). The as-built elevation and locations of the geotextile demarcation layer will be surveyed by a NYS-licensed surveyor to represent the horizon of the remaining impact zone for inclusion in a revised SMP. In areas where hardscape is proposed, all components of the LPMEC will be replaced with the hardscape and the hardscape will serve as the new cap.

In areas where hardscape will not be installed, the engineered cap will be restored to consist of at least 12 inches of NYSDEC-approved topsoil or clean backfill, a GCL, gravel venting layer (12-inches of stone), and three layers of geotextile fabric overlying remaining contaminated soil. The demarcation layer, consisting of three layers of geotextile fabric overlying remaining contaminated soil, will be replaced to provide a visual reference to the top of the remaining impact zone, the zone that requires adherence to special conditions for disturbance of impacted soil, as defined in the EWP. The as-built elevation and locations of the demarcation layer will be surveyed by a NYS-licensed surveyor to document the horizon of the remaining impact zone for inclusion in a revised SMP. The SMP must be adhered to for demarcation layer. Refer to Detail 5 of Drawing C-506, provided in Attachment 5, for engineered cap restoration details.

Intrusive activities will be performed in a manner that minimizes damage to the ECs (e.g., engineered cap, monitoring and recovery wells, non-aqueous phase liquid collection trench). If damaged, controls will be properly restored in accordance with Detail 5 of Detail Drawing C-506, provided in Attachment 5. Minimum guidelines to perform intrusive activities that breach the engineered cap are identified below.

- The contractor shall remove each layer of the engineered cap in a careful manner to avoid intermixing of the various components. Careful segregation of the various cap component materials will allow for reuse of the materials during the engineered cap reconstruction.
- Upon exposing the geotextile fabric layers or the GCL, the contractor shall carefully cut the material on three sides along the perimeter of the excavation. This cut will allow for the fabric or the GCL to be folded out beyond the limits of the excavation. Once folded, the contractor shall protect the materials during redevelopment activities so as to avoid damage and allow for reuse of the materials during the engineered cap reconstruction.

- After the geotextiles/GCL have been removed from the excavation area, excavation activities may continue in accordance with this requirement of the SMP. Materials located beneath the GCL are considered to be contaminated and shall be handled accordingly.
- After intrusive activities have been completed, ECs shall be restored in accordance with the requirements of the SMP and the details provided in this NOIA for continued function as intended. Where restored in kind, each layer of the engineered cap shall be restored by returning the material back into the excavation in reverse order of removal. The edges of the geotextiles shall be repaired by adding additional like materials, in an overlapping pattern (minimum of 2 feet), along the excavation perimeters. The overlap seams formed in the GCL shall be repaired in the same manner as which the GCL was installed with the addition of powdered bentonite in accordance with the manufacturer's specifications.
- The excavation must be extended a suitable distance to allow for additional geotextile/GCL material to overlap the existing material within the excavation. Overlaps shall be a minimum of 2 feet.
- Cap materials overlying the geotextiles may be reused if properly segregated and protected during removal and staging/stockpiling. If additional material is required to be imported to the Site, the material shall meet the requirements of the SMP. Material utilized to restore the ECs shall be similar to those utilized to construct the ECs as described in the SMP. Where the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt for fleet vehicle storage), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining impacted soil. A figure showing the modified surface will be included in the subsequent PRR and in an updated SMP.

3.10 Monitoring Well Restoration

Monitoring and NAPL recovery wells that were installed as part of previous investigations and recovery wells associated with the NAPL collection trench are located throughout the site. The following twelve monitoring and NAPL recovery wells will remain in place throughout redevelopment: MW-1, MW-13, MW-14, RW-1, RW-1A, RW-1B, RW-2B, DRW-4, DRW-10 through DRW-12, and DRW-16. The locations of the twelve monitoring and/or NAPL recovery wells that will remain in place are shown on the Site Plan provided in Attachment 2. Monitoring and NAPL recovery wells that will remain in place during redevelopment will be protected during excavation, grading, and installation of the site cover. If any monitoring or recovery wells are damaged during redevelopment, the wells be replaced in-kind and in accordance with the SMP in coordination with National Grid and NYSDEC.

3.11 Excavation Contingency Plan

Any previously unknown or unexpected potentially MGP-impacted media identified by screening (i.e., visual, olfactory, and/or instrumental [PID]) during invasive Site work will be promptly

communicated by phone to National Grid, and National Grid will notify the NYSDEC. Reportable quantities of petroleum product will also be reported to the NYSDEC Spill Hotline. These findings will be also included in the PRR. If underground storage tanks (UST) or other previously unidentified contaminant sources are found during subsurface excavations, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC will be promptly notified of the discovery. If potential MGP-related impacts are encountered at unexpected depth or locations, Site activities will be suspended, and National Grid will be notified and will evaluate the observed conditions in a manner and timeframe that does not interfere with the W12th Street Owner/operator's construction schedule, to the extent reasonably feasible. National Grid may determine that laboratory testing is required to evaluate the observed conditions for concentrations and characteristics. If the encountered materials are determined to be MGP-impacted, then the encountered materials will be segregated and stockpiled for disposal at a NYSDEC- and National Grid-approved facility. If the encountered materials are determined to not be MGP-impacted but exhibit evidence of impacts (e.g., petroleum- or solvent-like impacts) then the encountered materials will be segregated and stockpiled for disposal at a NYSDEC- and National Grid-approved facility. Non-impacted materials will be segregated as either material requiring off-site disposal or material requiring analytical testing prior to on-site reuse, per the conditions detailed in Section 2.8.

Sampling will be performed on product, sediment, and surrounding soil, etc., as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (Target Analyte List metals; Target Compound List VOCs, SVOCs [including 1,4-dioxane], pesticides, PCBs, PFAS, and free cyanide). If future sampling results provide a sufficient justification to limit the list of analytes, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling. Any tanks will be closed in accordance with NYSDEC regulations and guidance.

3.11.1 UST Removal

USTs may be encountered during excavation. If USTs or other previously unidentified contaminant sources are discovered during redevelopment, activities shall be suspended until sufficient equipment is mobilized to address the condition and the NYSDEC Project Manager will be promptly notified by phone. USTs and/or associated appurtenances encountered during redevelopment excavation would be decommissioned, disposed of off-site, and registered with the NYSDEC Petroleum Bulk Storage unit in accordance with the SMP, EWP, 6 NYCRR Part 613.9, NYSDEC CP-51, DER-10 Section 5.5, and other applicable NYSDEC tank closure requirements. Response measures to prevent the release of hazardous substances or petroleum products to the environment shall be conducted by the contractor as appropriate. Reportable quantities of petroleum product will also be reported by the W12th Street Owner's QEP to the NYSDEC Spill Hotline. If the above conditions are identified during redevelopment, the NYSDEC will be notified according to requirements set forth in the SMP, EWP, and this NOIA.

3.12 Demobilization

After redevelopment activities are completed, the contractor will be responsible for demobilizing labor, equipment, and materials not designated for off-site disposal. Langan will document that the contractor performs follow-up coordination and maintenance for the following activities:

- Removal of sediment and erosion control measures and disposal of materials in accordance with applicable rules and regulations;
- Removal of remaining impacted material or waste;
- Equipment decontamination; and
- General refuse disposal.

3.13 Community Air Monitoring Program

A site-specific Community Air Monitoring Program (CAMP) was developed to be consistent with NYSDOH guidance and NYSDEC DER-10 Appendices 1A and 1B and is included as Appendix E of the SMP. A copy of the NYSDOH Generic CAMP, as described in Appendix 1A of NYSDEC DER-10 is included as Attachment 11. The CAMP will be conducted during all ground-intrusive activity on the Site. Air sampling station locations will be chosen based on generally prevailing wind conditions and automatically adjusted based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported in the daily reports provided to National Grid, and the NYSDEC and NYSDOH Project Managers by the end of each day following the reporting period (or at a frequency acceptable to them). The W12th Street Owner's QEP will implement the CAMP during intrusive work. The W12th Street Owner is responsible for work zone and any other health and safety monitoring, as described in the Construction Health and Safety Plan (CHASP). Air monitoring results will be provided in Daily and Monthly reports.

Daily deliverables will include preparation of daily tables, as listed in Section 2.5.2 of the Site CAMP, and will include the following:

- Daily maximum instantaneous and averaged total VOC (TVOC) concentrations compared to the TVOC Action Level
- Daily maximum instantaneous and averaged particulate matter less than 10 microns in diameter (PM-10) concentrations compared to the PM-10 Action Level
- Supplemental perimeter walk-around PM-10 concentrations compared to the Action Level (if any)
- Supplemental perimeter walk-around TVOC concentrations compared to the TVOC Action Level (if any)
- Maps showing air monitoring station locations

The following weekly tables will be prepared:

- Maximum 15-minute average of TVOC and PM-10 concentrations

- Upwind and downwind comparison of Response Level and Action Level reached during the week if the daily maximum 15-minute average concentrations of TVOC and PM-10 exceeded a Response Level or Action Levels
- Summary of site activities
- Maps showing air monitoring station locations

Air monitoring results will include concentrations of particulate matter smaller than 10 microns in diameter (PM-10) and VOCs detected in the air during ground-intrusive activities. Concentrations attributable to on-site ground-intrusive activities will be shown on a graph. Any exceedances of PM-10 or VOC levels above regulated levels in a 15-minute period and any interferences with air monitoring will be reported in the Daily Reports.

3.13.1 Adjoining Parcels

The adjoining parcels are used for commercial and industrial purposes, with the surrounding area generally consisting of residential, commercial, industrial, and institutional (e.g., schools and churches) uses. No schools or day care facilities are located on the site. Sensitive receptors, as defined in the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10), within a half-mile of the site include those listed below:

Number	Name (Approximate distance from site)	Address
1	P.S. 90 – The Magnet School for Environmental Studies and Community Wellness (about 0.15 miles south of the site)	2840 West 12 th Street Brooklyn, NY 11224
2	Public School 303K/ I.S. 303 Herbert S. Eisenberg/ Coney Island Preparatory Middle School (about 0.15-mile east of the site)	501 West Avenue Brooklyn, NY 11224
3	Rachel Carson High School for Coastal Studies (about 0.15-mile east of the site)	521 West Avenue Brooklyn, NY 11224
4	John Dewey High School (about 0.31-mile northeast of the site)	50 Avenue X Brooklyn, NY 11223
5	Liberation Diploma Plus (0.38-mile southwest of the site)	2865 West 19 th Street Brooklyn, NY 11224
6	K410 Abraham Lincoln High School/ P.S. K053 (0.38-mile east of the site)	2800 Ocean Parkway Brooklyn, NY 11235
7	Little Scholars at Neptune Avenue (0.38-mile southeast of the site)	448 Neptune Avenue Brooklyn, NY 11224
8	P.S. 100 The Coney Island School (0.39-mile southeast of the site)	2951 West 3 rd Street Brooklyn, NY 11224
9	YDE Girls Elementary School (0.41-mile northeast of the site)	325 Avenue Y Brooklyn, NY 11223
10	P.S. 212 The Lady Deborah Moody School (0.42-mile northeast of the site)	87 Bay 49 th Street Brooklyn, NY 11214
11	P.S. 370 (0.44-mile southeast of the site)	3000 West 1 st Street Brooklyn, NY 11224

No adjoining properties are considered sensitive receptors, and the nearest sensitive receptor is over 750 feet (about 0.15 miles) south of the site across Coney Island Creek. As such, special CAMP requirements are not required during implementation of the redevelopment.

3.14 Dust Control Plan

Particulate monitoring must be conducted according to the CAMP provided as Appendix E of the SMP. If particulate levels at the Site exceed the thresholds listed in the CAMP or if airborne dust is observed on the Site or leaving the Site, the dust suppression techniques listed below will be employed by the contractor. A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of an on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger areas will be done in stages to limit the area of exposed, unvegetated soil vulnerable to dust production.
- Gravel approved for import by the NYSDEC and National Grid's QEP will be used for on-site roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.
- In the event that complaints are received for dust or airborne dust is observed on or leaving the site, the contractor will take the appropriate response actions for dust suppression.

3.15 Odor Control Plan

Odors deriving from Site impacts may cause a nuisance to some Site workers and the surrounding community. Specific odor control methods to be used on a routine basis will include all reasonable and necessary means as described in the following paragraph. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. The NYSDEC and NYSDOH will be notified by the W12th Street Owner's QEP of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the contractor, and any measures that are implemented will be discussed in the PRR.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soil. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soil to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to

sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

3.15.1 Other Nuisances

The following items may be necessary depending on the type of wastes present, the location of the Site and other site-specific concerns. These plans are generally not required for submission to the NYSDEC but are generally required as part of redevelopment.

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial and redevelopment work.

A plan will be developed and utilized by the contractor for all remedial and redevelopment work to ensure compliance with local noise control ordinances.

3.16 Green and Sustainable Remediation (GSR) Practices

The green and sustainable remediation (GSR) components that will be considered during redevelopment are as follows:

- Environmental impacts of the redevelopment over the long term
- Reducing direct and indirect greenhouse gases (GHG) and other emissions
- Increasing energy efficiency and minimizing use of non-renewable energy
- Conserving and efficiently managing resources and materials
- Reducing waste, increasing recycling, and increasing reuse of materials that would otherwise be considered a waste
- Maximizing habitat value and creating habitat when possible, including maximizing the planning of trees, shrubs, and other carbon dioxide sinks in redevelopment
- Fostering green and healthy communities and working landscapes which balance ecological, economic, and social goals
- Encouraging green and sustainable redevelopment
- Incorporating the GSR principles and techniques to the extent feasible in the future development at this site (i.e., future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York [or most recent edition] to improve energy efficiency as an element of construction)

BMPs for the project related to these GSR metrics, and BMPs for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, would be incorporated into the redevelopment, as appropriate. The project design specifications would include detailed requirements, including implementation of the BMPs described in Section

2.19.1. A BMP assessment and an environmental footprint analysis would be conducted at the completion of the redevelopment. As practicable, water consumption, GHG emissions, renewable and non-renewable energy use, waste reduction, and material use would be estimated at the end of the redevelopment. Progress with respect to GSR metrics would be tracked during implementation of the redevelopment and reported in an updated SMP, to be prepared by National Grid in coordination with the Property Owners.

3.16.1 Green Remediation Principals and BMPs

The NYSDEC DER-31: Green Remediation Policy (DER-31) requires that green remediation concepts and techniques be considered during all stages of the redevelopment, with the goal of improving the sustainability of the work and summarizing the net environmental benefit of any implemented green technology.

Green remediation principles and techniques will be implemented to the extent feasible during redevelopment, in accordance with DER-31. The green remediation components that will be evaluated are as follows:

- Waste Generation
- Energy Usage
- Emissions
- Water Usage
- Land and/or Ecosystems

The redevelopment will include the implementation of several BMPs related to these green remediation components. The BMPs are outlined below.

Waste Generation

Waste generation considers the management of waste associated with redevelopment activities and any waste reduction projects including, but not limited to, material reuse and recycling. Several waste streams will be generated during redevelopment (e.g., dewatering fluids, soil, polyethylene sheets used for stockpile coverage and separating types of contamination, and decontamination materials). When possible, an effort will be made to minimize consumption/generation of such materials. If possible, decontamination and reuse of applicable materials will be considered. Electronic methods of data collection (e.g., tablets) will also be used to reduce paper consumption when possible.

Electrical Energy Use

Energy usage considers the electricity usage needed for redevelopment activities. Energy will be required for charging equipment (e.g., PIDs, air monitoring equipment). Battery-powered equipment will be turned off when not in use to limit charging activities.

Emissions

Emissions tracking considers fuel usage for transportation of personnel to and from the site, trucks used for export of contaminated material or import of backfill material, equipment and laboratory sample couriers, and construction equipment.

To reduce fuel usage, trucks and heavy machinery operators will be encouraged to reduce idling time and shut down vehicles or equipment when not in use. Ultra-low sulfur diesel (ULSD) fuel and the best available technology (BAT) for reducing emissions will be used for construction vehicles. The Contractor will also be encouraged to perform routine, on-time maintenance such as oil changes to improve fuel efficiency.

When possible, personnel will be encouraged to take public transport and equipment/sample deliveries and pickups will be consolidated to reduce transport needs.

Water Usage

Water usage considers sources of water for tasks such as decontamination, irrigation, etc. The public water supply will be used when water is required for decontamination activities or dust suppression. This will be required for effective implementation of the redevelopment and the protection of human health. Water will only be consumed when necessary, and consumption will be in accordance with local regulations.

Land and/or Ecosystems

The site is within a commercial and industrial area of the Coney Island neighborhood of Brooklyn, New York. As indicated in the Site Plans, about 6.26 acres of TWAA will be disturbed as part of this redevelopment project. Disturbance of Coney Island Creek (OU-2) is not expected as part of the redevelopment.

4.0 CHASP

A CHASP that meets all Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response requirements has been developed and will be implemented during the Site work to protect worker safety. A copy of the site-specific CHASP is provided as Attachment 10 of this NOIA. The Site Safety Coordinator will document full compliance with the CHASP in accordance with applicable health and safety laws and regulations. Emergency telephone numbers will be posted at the Site location before any work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; personal protection equipment levels; and other relevant safety topics including a highlighted route map to the nearest hospital/emergency room. Meetings will be documented in a log book or specific form. Potential on-site chemicals of concern include PAHs, VOCs, and metals. Information fact sheets and/or summary tables for each contaminant group are included in the CHASP. A copy of this CHASP will be available at the Site during redevelopment.

5.0 REPORTING

The following sections describe reports that will be prepared during and after the redevelopment of the Site as a fleet vehicle storage lot.

5.1 Daily Reports

Daily reports will be submitted to National Grid and the NYSDEC and NYSDOH Project Managers during on-site redevelopment activities by the end of each day following the reporting period (or at a frequency acceptable to them). These reports will include the following items:

- A summary of odor and dust problems and corrective actions, if any;
- An update of redevelopment progress made during the reporting day;
- A figure showing the location and type of work performed during the reporting day and previously on the Site;
- Photographs showing the Site conditions and examples of work conducted;
- Locations of work and quantities of material imported and exported from the Site;
- References to a map showing Site activities, work locations, CAMP station locations, and daily wind direction;
- A summary of complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including any exceedances, including trigger action levels; and
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to this NOIA, or other sensitive or time critical information; however, such conditions must also be included in the daily reports. Emergency conditions and changes to this NOIA will be addressed directly to NYSDEC via personal communication.

Daily Reports will reference the NYSDEC-assigned project number and include a description of daily activities keyed to a map that identifies site activities, work locations, CAMP station locations, and daily wind direction.

5.2 Deviations

Necessary deviations from this NOIA, the SMP, or the EWP will be coordinated with National Grid and the NYSDEC in advance. Notification will be provided to National Grid and the NYSDEC by telephone/email for conditions requiring immediate action (e.g., conditions judged to be a

danger to the surrounding community). Based on the significance of the deviation, an addendum to this NOIA may be necessary and will include:

- Reasons for deviating from this NOIA
- Approval process to be followed for changes/editions to this NOIA

5.3 SMP Update

The redevelopment will include installation of an alternative cover system from that which existed prior to the excavation activities and will constitute a modification of the cover element of the remedy and the upper surface of the remaining impacted soil. A figure showing the modified surface will be included in the subsequent PRR and in an updated SMP, to be prepared by National Grid.

6.0 CERTIFICATION

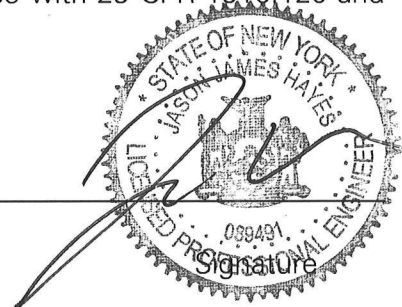
I, Jason Hayes, certify that I am currently a NYS registered professional engineer as in defined in 6 NYCRR Part 375 and that this NOIA was prepared in accordance with 29 CFR 1910.120 and the NYSDEC-approved SMP.

089491

18 July 2025

NYS Professional Engineer #

Date



ATTACHMENT 1

PHASE II ESI

PHASE II ENVIRONMENTAL SITE INVESTIGATION REPORT

for

**2731 West 12th Street
Block 7247, Lot 106
Brooklyn, New York 11223**

Prepared for:

**Prologis, L.P.
Pier 1, Bay 1
San Francisco, CA 94111**

Prepared by:

**Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
360 West 31st Street, 8th Floor
New York, New York 10001**



**Mimi S. Raygorodetsky
Principal/Vice President**

LANGAN

**November 6, 2023
170697301**

November 2023

Mr. Ken Simmons
Prologis, L.P.
Pier 1, Bay 1
San Francisco, California 94111

Subject: Phase II Environmental Site Investigation Report
2731 West 12th Street
Block 7247, Lot 106
Brooklyn, New York
Langan Project: 170697301

Dear Mr. Simmons:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) is submitting this Phase II Environmental Site Investigation (ESI) Report for the property at 2731 West 12th Street in Brooklyn, New York.

We appreciate the opportunity to assist you with this project. If you have questions or need information clarified, please call Mimi Raygorodetsky at 212.479.5441.

Sincerely yours,

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.



Andrew Kerr
Associate



Robert (Rory) S. Johnston, P.E.
Senior Principal/ Executive Vice President

Cc: Mimi Raygorodetsky, Smita Day, Elizabeth Adkins - Langan

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1.0 INTRODUCTION

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) completed a Phase II Environmental Site Investigation (ESI) on behalf of Prologis, L.P. for the property located at 2731 West 12th Street in Brooklyn, New York (the 'site'). The objectives of the Phase II ESI were to 1) investigate potential areas of concern identified at the site in the Langan's September 30, 2022 Phase II ESI Work Plan; 2) supplement existing data collected during previous investigations performed by others; and 3) identify subsurface conditions that may impact future construction/development and associated costs.

The Phase II ESI was implemented between March 27 and 31, 2023. The investigation included completion of a geophysical survey, advancement of soil borings, installation of soil vapor probes, and collection of soil and soil vapor samples for laboratory analysis.

The report is organized as follows:

- Section 2.0: Describes the site background
- Section 3.0: Presents the Phase II ESI methodology
- Section 4.0: Presents the findings of the Phase II ESI
- Section 5.0: Presents conclusions based on the findings

2.0 BACKGROUND

2.1 Site Location and Description

The site is located at 2731 West 12th Street and is identified as Block 7247, Lot 106 on the Brooklyn Borough Tax Map. The site is about 16.8 acres in area and is currently a vacant, vegetated lot that includes remnant concrete foundation elements and out-of-service electrical equipment associated with historical site operations.

The site is bound to the north by an elevated highway and at-grade access road (Shore Parkway) followed by a Metropolitan Transit Authority (MTA) rail yard; to the east and south by Coney Island Creek; and to the west by at-grade MTA rail lines followed by industrial and commercial properties. According to the May 4, 2023 draft ALTA/NSPS Land Title Survey prepared by Langan, the elevation of the site ranges from about elevation¹ (el.) +16 in the northern part of the site to el. -1 in the southern part of the site. The surrounding area slopes to the south towards Coney Island Creek, which adjoins the site to the east and south. A Site Location Map is included as **Figure 1**, and the site plan is presented on **Figure 2**.

2.2 Environmental History

The site is currently owned by National Grid (NatGrid) and was historically used by the Brooklyn Borough Gas Company (BBGC) as a manufactured gas plant (MGP) from 1908 to 1951. In 1951, MGP operations at the site ceased and BBGC converted the gas delivery operations to a natural gas-based system. In 1959, BBGC was acquired by the Brooklyn Union Gas Company (later became KeySpan Corporation), and between 1960 and 1966 multiple buildings associated with the MGP operations at the site were decommissioned and demolished. In the early 1970s, a gate regulator station and two gas holders remained operational providing natural gas service, and were subsequently demolished by the 1980s. The eastern part of the site was filled with material of an unidentified origin in the early 1970s and baseball fields were constructed in the late 1980s. By the mid-1990s, the baseball fields were abandoned and the site has generally remained vacant through present day.

The site, along with two adjoining tax lots (Block 7247, Tax Lots 13 and 218), was previously remediated pursuant to an Order on Consent and Administrative Settlement, Index No. D2-001-94-12, and a subsequent Order on Consent and Administrative Settlement, Index No. A2-0552-0606 (the "Orders") to the satisfaction of the New York State Department of Environmental Conservation (NYSDEC). Remedial actions were described in a March 2001 Record of Decision (ROD) and March 2002 ROD, prepared by the NYSDEC (collectively, the "ROD"). The site, along with Lots 13 and 218, is currently listed as a Class '4' site² in the New York State Inactive Hazardous Waste Disposal Site (SHWS) Remedial Program as the Former Brooklyn Borough Gas Works Site (NYSDEC Site No. C224026). The site, along with Lots 13 and 218, is now subject

¹ Elevations herein are presented in feet relative to the North American Vertical Datum of 1988 (NAVD88).

² This classification is assigned to a site that has been properly closed but that requires continued site management consisting of operation, maintenance and/or monitoring. Class 4 is appropriate for a site where remedial construction actions have been completed for all operable units, but the site has not necessarily been brought into compliance with standards, criteria, or guidance (e.g., a groundwater extraction and treatment system has been installed and is operating properly but groundwater standards have not been achieved yet).

to ongoing site management in accordance with a June 10, 2019 NYSDEC-approved Site Management Plan (SMP), prepared by GEI Consultants, Inc., P.C. (GEI).

2.3 Phase I ESA Findings

The December 23, 2022 Draft Phase I ESA prepared by Langan identified the following recognized environmental condition (REC):

1. Current and Historical Use of Adjoining Properties: As early as 1924, the MTA operated a rail yard on the western-adjoining property. As early as 1950, the Shore Parkway was constructed with steel viaducts over the northern-adjoining roadway. Both the western- and northern-adjoining structures are still in operation. Based on the approximate construction dates, paint applied to these structures as part of historical maintenance may contain lead. During the site reconnaissance, paint on the support structures of Shore Parkway was observed to be in poor condition, as evidenced by chipped and peeling paint. Although the site was previously remediated, lead from deteriorating paint on structures in the adjoining rail yard and highway likely impacted surficial soil at the site. The likely presence of lead in surficial soil from deteriorating paint on adjoining structures is a REC.

The following controlled REC (CREC) was identified:

1. Documented Contamination at the Site: The site was the subject of previous investigations that identified soil and groundwater containing various chemicals (polyaromatic hydrocarbons [PAH]; benzene, toluene, ethylbenzene, and xylenes; styrene; polychlorinated biphenyls (PCB); total cyanide; arsenic; chromium; copper; lead; manganese; mercury; nickel; and zinc) that relate to the former site use as an MGP. To remediate the site, NatGrid entered into Orders with the NYSDEC.

In March 2001 and March 2002, RODs were issued by the NYSDEC identifying the selected site remedies. The site was divided into three operable units (OU) to address remediation at the upland portion of the SHWS (OU-1 and OU-3) and the surrounding Coney Island Creek (OU-2). According to the November 2009 Final Engineering Report (FER) prepared by Paulus, Sokolowski and Sartor Engineering, PC (PS&S PC) (revised April 2013), the remediation of OU-1 through OU-3 has been completed. The remediation was conducted in two phases between November 2003 and October 2008 and primarily consisted of contaminated soil and sediment removal, construction of a site cap and a steel sheet pile barrier wall, installation and monitoring of a non-aqueous phase liquid (NAPL) collection trench, and installation and monitoring of groundwater and NAPL monitoring wells across the site.

The site is subject to post-remedial management and requirements under a NYSDEC-approved SMP. The SMP outlines the Institutional and Engineering Controls (ICs and ECs) required at the site to protect human health and the environment. The ICs include an environmental notice, which establishes the following: the SHWS site can only be used for commercial or industrial uses; groundwater use is prohibited without further treatment; ground-intrusive work must be performed in accordance with the SMP; and engineering controls must be implemented, maintained, inspected, and monitored. ECs

include a sealed sheet pile barrier wall, 50-foot ecological buffer zone, NAPL collection trench, dense NAPL recovery wells, low-permeability multi-component environmental cap (LPMEC) with passive venting system, and perimeter fencing. As part of the SMP, an annual Periodic Review Report (PRR) must be prepared and submitted to the NYSDEC.

2.4 Geology

According to the FER, the site is underlain by an about 3-foot-thick LPMEC, which consists of at least 6 inches of topsoil underlain by 2 feet of imported soil and a geosynthetic clay liner (Bentofix EC 1000), followed by historic fill to about 10 feet below grade surface (bgs). The historic fill is underlain by unconsolidated Pleistocene deposits from about 10 to 172 feet bgs and consists primarily of fine- to coarse-grained sand with a clay and silt layer from 59 to 60 feet bgs and clay from 170 to 172 feet bgs. Bedrock was not encountered during previous environmental investigations.

During the Phase II ESI, the subsurface stratigraphy was generally observed to consist of the LPMEC—including an about 6- to 12-inch layer of topsoil, 1- to 2-foot layer of fine sand with trace silt and gravel, geotextile fabric³, and 3- to 30-inch layer of gravel—underlain by a fill layer and, in some cases, native sand. The fill layer was comprised of sand, gravel, and clay, with varying amounts of wood, brick, metal fragments, slag, and concrete extending to depths from about 6 to 16 feet bgs. In borings where the fill layer did not extend to the boring termination depth, the fill was underlain by native soil consisting of varying amounts of sand, clay, silt, and gravel with organic matter. Bedrock was not encountered during the Phase II ESI (maximum boring depth was 19 feet bgs).

2.5 Hydrology and Hydrogeology

Groundwater flow is typically topographically influenced, as shallow groundwater tends to originate in areas of topographic highs and flows toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeological network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeological and anthropogenic variables such as precipitation, evaporation, extent of vegetative cover, and coverage by impervious surfaces. Other factors influencing groundwater include depth to bedrock, artificial fill, and variability in local geology and groundwater sources or sinks. Potable water is provided by the City of New York and is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

As detailed in the FER, following construction completion of the perimeter subsurface sheet pile barrier wall and site-wide LPMEC, the upper 30 feet of groundwater beneath the site is generally isolated from the surrounding hydrogeologic environment, including Coney Island Creek and its tidal influence. During a monitoring well gauging event implemented by GEI between August 8 and 9, 2022, groundwater was encountered between about 7 and 13 feet bgs, corresponding to between el. 0.17 and 6.73, as summarized on Table 3 of GEI's December 2022 PRR.

³ The geotextile fabric component of the LPMEC was not identified in soil borings SB03_A, SB07, SB09, and SB11.

During the Phase II ESI, groundwater was encountered from about 7 to 12 feet bgs. Groundwater in New York City is not used as a potable water source.

3.0 FIELD INVESTIGATION

The Phase II ESI was implemented between March 27 and 31, 2023 and consisted of a geophysical survey; installation of 15 soil borings and 4 soil vapor points; and collection and laboratory analysis of 24 grab soil samples, 4 soil vapor samples, and 1 ambient air sample. Quality assurance/quality control (QA/QC) samples were collected for soil and soil vapor samples. A sample summary is provided in **Table 1**.

3.1 Geophysical Survey

Nova Geophysical Services, Inc. (NOVA) conducted a geophysical survey under Langan observation on March 27 and 28, 2023 using ground-penetrating radar and electromagnetic detection equipment across the entire site to clear proposed sample locations and attempt to identify underground storage tanks (UST), utilities, and/or subsurface anomalies at the site. A copy of the geophysical survey report is included in **Appendix A**.

3.2 Soil Investigation and Sampling Methodology

The soil investigation included advancement of 15 soil borings (SB01 through SB14) by Lakewood Environmental Services Corp. of Smithtown, New York (Lakewood) under observation by Langan field personnel. The borings were located to avoid utilities, obstructions, and subsurface anomalies. Soil boring locations are shown on **Figure 2**.

The soil borings were advanced using a Geoprobe 6610DT drill rig to between about 12 and 19 feet bgs. Soil samples were collected into MacroCore samplers lined with 4-foot-long dedicated acetate sleeves. Extracted soil was screened with a photoionization detector (PID) equipped with a 10.6 electron volt lamp, inspected for visual and olfactory evidence of contamination, and classified by Langan field personnel. The soil boring logs are provided in **Appendix B**.

Up to two grab soil samples were collected from 13 of the 15 borings for laboratory analysis. Borings SB03_B and SB14 were advanced to install soil vapor installation points and soil samples were not collected. Soil samples were collected from the upper two feet of exposed soil, the two-foot interval immediately below the LPMEC, the interval of greatest degree of petroleum- or chemical-like impacts (if observed), and/or within the historic fill. TerraCore sampling kits were used to collect soil samples for volatile organic compound (VOC) analysis. Two duplicate soil samples, two matrix spike/matrix spike duplicate (MS/MSD) soil sample sets, two field blanks, and two trip blanks were also collected for QA/QC purposes.

Soil samples were collected into laboratory-supplied batch-certified clean glassware and TerraCore samplers (VOC samples only) and submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory (Alpha Analytical, Inc. [Alpha] of Westborough, MA [ELAP ID #11148]) via courier service under standard chain-of-custody protocol. New York Analytical Services Protocols Category B laboratory reports were provided by Alpha. Soil samples were analyzed for one or more of the following parameters (see **Table 1** for analysis by sample ID):

- Target Compound List (TCL) VOCs by United States Environmental Protection Agency (USEPA) Method 8260D

- TCL semivolatile organic compounds (SVOC) by USEPA Method 8270E
- Herbicides by USEPA Method 8151A
- PCBs by USEPA Method 8082A
- Pesticides by USEPA Method 8081B
- Target analyte list (TAL) metals by USEPA Method 6010D and 7471B
- Total cyanide by USEPA 9012B
- Hexavalent chromium by USEPA Method 7196A

3.3 Soil Vapor Investigation and Sampling Methodology

Lakewood installed four soil vapor sampling points (SV01, SV02, SV03, and SV04) under the observation of Langan field personnel. Soil vapor points were installed using a Geoprobe 6610DT drill rig to depths from about 2.5 to 7 feet bgs. Soil vapor sampling point SV03 was installed to 2.5 feet bgs to evaluate soil vapor conditions within the gravel vapor collection layer of the LPMEC. All other soil vapor sampling points were installed at least 5 feet bgs and 2 feet above the observed groundwater table. Soil vapor sampling locations are shown on **Figure 2**.

The soil vapor points were installed in accordance with the NYSDOH Soil Vapor Guidance and consisted of 2-inch polyethylene implants threaded into 3/16-inch-diameter polyethylene tubing. The annulus of each soil vapor point was filled with No. 2 sand above the top of the implant, followed by a hydrated bentonite seal to surface grade. Before collecting the soil vapor sample, a minimum of three implant volumes (i.e., the volume of the sample probe and tubing) were purged from the sample port at a rate of less than 0.2 liters per minute using a RAE Systems MultiRAE meter. The purged soil vapor was monitored for VOCs with the MultiRAE during purging.

As a QA/QC measure, a helium tracer gas was introduced into an above-grade sampling chamber to verify that the soil vapor points were properly sealed above the target sampling depth, thereby preventing subsurface infiltration of ambient air before sampling. Concentrations of less than 10 percent helium in the sampling tube were considered sufficient to verify a tight seal at each sample point.

After the integrity of each seal was confirmed, vapor samples were collected for a 2-hour sampling period into laboratory-supplied batch-certified clean 6-liter Summa canisters calibrated with flow controllers. An ambient air sample was collected simultaneously from about 3 to 5 feet above ground (breathing height).

Soil vapor and ambient air samples were submitted to Alpha via courier service under standard chain-of-custody protocols and analyzed for VOCs by USEPA Method TO-15. Vapor sampling logs are provided in **Appendix C**.

3.4 Quality Assurance/Quality Control Sampling

During the Phase II ESI, the following quality control samples were collected:

Soil QA/QC Samples

- Two field duplicate samples
- Two MS/MSD sample sets

- Two field blanks
- Two trip blanks

Soil Vapor QA/QC Samples

- One ambient air sample

The field duplicate samples were collected to assess the precision of the analytical methods relative to the sample matrix. The duplicates were collected from the same material as the primary sample by splitting the volume of a homogenized sample collected in the field into two sample containers.

The MS/MSD sample sets were collected to assess the effect of the sample matrix on the recovery of target compounds or target analytes.

The field blanks were collected to determine the effectiveness of the decontamination procedures for the down-hole soil sampling equipment and the cleanliness of unused neoprene gloves and acetate liners. Field blank samples consisted of deionized, distilled water provided by the laboratory passed through the sampling apparatus. Field blank samples were analyzed for the same list of analytes as the soil samples.

The trip blank samples were collected to assess the potential for contamination of the sample containers and samples during transport from the laboratory, to the field, and back to the laboratory for analysis. Trip blanks contain about 40 milliliters of acidic water (doped with hydrochloric acid) that is prepared and sealed by the laboratory when the empty sample containers are shipped to the field, and then unsealed and analyzed for VOCs by the laboratory when the sample shipment is received from the field.

An ambient air sample was collected to assess ambient air conditions and determine whether conditions during soil vapor sampling could have potentially interfered with sampling results. The ambient air sample was analyzed for the same parameter list as the soil vapor samples.

3.5 Data Validation

Laboratory analyses were conducted by Alpha in accordance with USEPA SW-846 and USEPA TO-15 methods, respectively. Analytical data was reported consistent with the NYSDEC Analytical Services Protocol Category B deliverable format. Environmental data will be reported electronically using the database software application Environmental Quality Information Systems as part of the NYSDEC's Environmental Information Management System.

The Phase II ESI data was validated by a Langan data validator in accordance with USEPA and NYSDEC validation protocols. A copy of the data usability summary report (DUSR) and the data validator's credentials are included in **Appendix D**.

A DUSR was prepared for each laboratory delivery group following data validation. The DUSRs present the results of the data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

Based on the results of data validation, the following qualifiers were assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- "U" - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the reporting limit or the sample concentration for results impacted by blank contamination;
- "UJ" - The analyte was not detected at a level greater than or equal to the reporting limit; however, the reported reporting limit is approximate and may be inaccurate or imprecise;
- "J" - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample;
- No Flag - Result accepted without qualification.

No major deficiencies were identified for this data set and data was judged to be 100% valid, as qualified. After data validation was completed, validated data was used to prepare the tables and figures included in this report. Copies of the DUSRs are provided in **Appendix D**.

4.0 OBSERVATIONS AND RESULTS

4.1 Geophysical Survey

A geophysical survey was conducted across the entirety of the site. Anomalous findings, as interpreted by NOVA, are summarized below:

- Subsurface anomalies resembling various utilities (e.g., electric and water) were identified on-site.
- Subsurface anomalies resembling concrete slabs likely associated with former gas holders were detected in the southwestern part of the site.
- A subsurface anomaly resembling a steel plate was detected in the western part of the site.
- An about 7-foot-wide by 13-foot-long subsurface anomaly resembling a potential UST was detected at about 6.5 feet bgs in the southern part of the site.

The geophysical survey report is included in **Appendix A**.

4.2 Subsurface Observations

Soil borings were advanced to between 12 and 19 feet bgs. During the Phase II ESI, the subsurface stratigraphy was generally observed to consist of the LPMEC—including an about 6- to 12-inch layer of topsoil, 1- to 2-foot layer of fine sand with trace silt and gravel, geotextile fabric⁴, and 3- to 30-inch layer of gravel—underlain by a fill layer and, in some cases, native sand. The fill layer was comprised of sand, gravel, and clay, with varying amounts of wood, brick, metal fragments, slag, and concrete extending to depths from about 6 to 16 feet bgs. In borings where the fill layer did not extend to the boring termination depth, the fill was underlain by native soil consisting of varying amounts of sand, clay, silt, and gravel with organic matter. Bedrock was not encountered during the Phase II ESI (maximum boring depth was 19 feet bgs).

Visual, olfactory, and/or PID evidence of impacts identified in the borings is summarized in the below table:

Boring ID	Location	Evidence of impacts	Depth of impacts (feet bgs)	Maximum PID reading (ppm)
SB01	Western part of the site	Petroleum-like odor	8.5 to 9.25	0.0
			14 to 15	0.0
SB02	Western part of the site	Petroleum-like odor	8.5 to 9	0.9
		Black staining; solvent-like odor; PID readings above background	9.75 to 11	120
		Coal tar-like odor; PID readings above background	14 to 16	19.5
SB03_A	Central part of the site	Coal tar	3 to 5	0.0
		Black staining; solvent-like odor	12 to 12.25	0.1
SB03_B	Central part of the site	Petroleum-like odor	14.5 to 16	1.8

⁴ The geotextile fabric component of the LPMEC was not identified in soil borings SB03_A, SB07, SB09, and SB11.

Boring ID	Location	Evidence of impacts	Depth of impacts (feet bgs)	Maximum PID reading (ppm)
SB04	Southern part of the site	Petroleum-like odor	8 to 10	0.1
		Petroleum-like odor; PID readings above background; sheen	13 to 16	30.9
SB05	Southwestern part of the site	Solvent-like odor; PID readings above background; sheen	7 to 15	693.3
SB06	Northwestern part of the site	Coal tar; petroleum-like odor; PID readings above background	10 to 13	18.9
SB08	Northern part of the site	Coal tar	8 to 9	6.7
		PID readings above background; sheen	11	15.4
SB09	Eastern part of the site	Sheen	13 to 13.5	3.5
SB10	Eastern part of the site	Sheen	13	2.5
SB11	Eastern part of the site	Coal tar; PID readings above background	9.5 to 10.5	42.2
		PID readings above background	12 to 14	131.1
SB12	Northeastern part of the site	Petroleum-like odor; sheen	13 to 15	0.1
SB13	Central part of the site, proximate to potential UST anomaly	Petroleum-like odor; sheen	9	0.0
SB14	Central part of the site	Sheen	9	3.9

ppm = parts per million

4.3 Soil Sample Analytical Results

Twenty-four soil samples were collected from 13 soil borings (SB01, SB02, SB03_A, SB04 through SB13) for laboratory analysis (plus QA/QC samples). Soil sample analytical results were compared to Title 6 of the New York Codes, Rules and Regulations (NYCRR) Part 375 Unrestricted Use (UU), Restricted Use Commercial (RUC), and Restricted Use Industrial (RUI) Soil Cleanup Objectives (SCO).

Soil sample analytical results are provided in **Table 2** and are presented on **Figures 3A and 3B**. Laboratory analytical reports for soil are provided in **Appendix E**.

VOCs

One or more of four VOCs were detected at concentrations exceeding the RUC and/or RUI SCOs in four soil samples collected from 6 to 15 feet bgs in three borings (SB02, SB04, and SB05). The following table summarizes concentrations of VOCs detected in soil samples above the RUC and RUI SCOs. VOC concentrations above the RUI SCOs are shown in **bold**.

Analyte	RUC SCOs	RUI SCOs	Unit	Minimum Detected Concentration above SCOs		Maximum Detected Concentration above SCOs	
1,2,4-Trimethylbenzene	190	380	mg/kg	390	SB05_8-10	520	SB05_6-8
Ethylbenzene	390	780	mg/kg	490	SB05_8-10	570	SB05_6-8

Analyte	RUC SCOs	RUI SCOs	Unit	Minimum Detected Concentration above SCOs		Maximum Detected Concentration above SCOs	
Naphthalene	500	1,000	mg/kg	630	SB04_13-15	4,500	SB05_6-8
Total Xylenes	500	1,000	mg/kg	1,300	SB05_8-10	1,500	SB05_6-8

mg/kg = milligram per kilogram

SVOCs

One or more of seven SVOCs were detected at concentrations exceeding the RUC and/or RUI SCOs in twelve soil samples collected from 2 to 15 feet bgs in ten borings (SB01, SB02, SB03_A, SB04, SB05, SB06, SB07, SB08, SB10, and SB11). The following table summarizes concentrations of SVOCs detected in soil samples above the RUC and RUI SCOs. SVOC concentrations above the RUI SCOs are shown in **bold**.

Analyte	RUC SCOs	RUI SCOs	Unit	Minimum Detected Concentration above SCOs		Maximum Detected Concentration above SCOs	
Benzo(a)anthracene	5.6	11	mg/kg	12	SB04_13-15	120	SB11_12-14
Benzo(a)pyrene	1	1.1	mg/kg	1.1	SB07_5-6.5 SODUP01_032723	59	SB11_12-14
Benzo(b)fluoranthene	5.6	11	mg/kg	8.9	SB04_13-15	45	SB11_12-14
Chrysene	56	110	mg/kg	57	SB06_12-14	76	SB11_12-14
Dibenz(a,h)anthracene	0.56	1.1	mg/kg	1.2	SB04_13-15	7.2	SB06_12-14
Indeno(1,2,3-cd)pyrene	5.6	11	mg/kg	19	SB06_12-14	22	SB11_12-14
Naphthalene	500	1,000	mg/kg	820	SB06_12-14	3,400	SB05_6-8

Metals

One or more of six metals (trivalent chromium, copper, lead, mercury, nickel, and zinc) were detected at concentrations above the UU SCOs in thirteen soil samples collected from 0 to 14 feet bgs in eight borings (SB02, SB03_A, SB04, SB07, SB09, SB10, SB11, and SB12). Metals were not detected at concentrations exceeding the RUC or RUI SCOs.

Pesticides

One or more of three pesticides (4,4'-DDD, 4,4'-DDE, and 4,4-DDT') were detected at concentrations above the UU SCOs in three soil samples collected from 2 to 4 feet bgs in two borings (SB09 and SB10). Pesticides were not detected at concentrations exceeding the RUC or RUI SCOs.

Herbicides and PCBs

Herbicides and PCBs were not detected above the UU SCOs in any of the samples collected.

4.4 Soil Vapor Sample Results

Four soil vapor samples (SV01_033023, SV02_033023, SV03_033023, and SV04_033023) were collected for laboratory analysis.

Soil vapor sample results were evaluated using the NYSDOH Decision Matrices contained in the October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York Decision Matrices for Sub-Slab Vapor and Indoor Air and subsequent updates (2017). The NYSDOH Decision Matrices (Matrices A, B, and C) address the compounds tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethene, cis-1,2-dichloroethene, vinyl chloride, methylene chloride and carbon tetrachloride. The matrix evaluation requires soil vapor and indoor air data. In the absence of indoor air sampling data, soil vapor results were evaluated using the lowest concentration for which monitoring or mitigation is recommended in the NYSDOH Decision Matrices.

Six of the eight VOCs (1,1-dichloroethene, carbon tetrachloride, cis-1,2-dichloroethene, methylene chloride, TCE, and vinyl chloride) listed in the NYSDOH Soil Vapor Guidance Decision Matrices were not detected in soil vapor. Two of the eight VOCs listed in the NYSDOH Soil Vapor Guidance Decision Matrices were detected in soil vapor samples, as summarized below:

- 1,1,1-TCA was detected in one soil vapor sample (SV01_033023) at a concentration of 3.42 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). An evaluation of 1,1,1-TCA concentrations using the NYSDOH decision matrices yields a recommendation of “no further action”.
- PCE was detected in two soil vapor samples at 1.74 $\mu\text{g}/\text{m}^3$ in SV01_033023 and 2.54 $\mu\text{g}/\text{m}^3$ in SV04_033023. An evaluation of PCE concentrations using the NYSDOH decision matrices yields a recommendation of “no further action”.

The soil vapor analytical results are summarized in **Table 3**. Laboratory analytical reports for soil vapor are provided in **Appendix F**.

4.5 Quality Assurance/Quality Control Results

QA/QC sample analytical results are provided in the laboratory reports and a QA/QC sample summary table is included as **Table 4**.

5.0 CONCLUSIONS

Findings and conclusions of the Phase II ESI are summarized below:

- Geophysical Survey: Subsurface anomalies, interpreted as various utility lines (e.g., electric and water), were detected across the site. Subsurface anomalies resembling concrete slabs likely associated with former gas holders were identified in the southwestern part of the site. A geophysical anomaly indicative of a potential UST was identified in the southern part of the site. Field evidence of petroleum impacts and benzene in soil were identified in samples collected from one boring advanced proximate to the potential UST.
- Stratigraphy: The subsurface stratigraphy was generally observed to consist of the LPMEC—including an about 6- to 12-inch layer of topsoil, 1- to 2-foot layer of fine sand with trace silt and gravel, geotextile fabric, and 3- to 30-inch layer of gravel—underlain by a fill layer and, in some cases, native sand. The fill layer was comprised of sand, gravel, and clay, with varying amounts of wood, brick, metal fragments, slag, and concrete extending to depths from about 6 to 16 feet bgs. In borings where the fill layer did not extend to the boring termination depth, the fill was underlain by native soil consisting of varying amounts of sand, clay, silt, and gravel with organic matter. Bedrock was not encountered during the Phase II ESI (maximum boring depth was 19 feet bgs).
- Hydrogeology: Groundwater was encountered in soil borings from about 7 to 12 feet bgs; these depths are generally consistent with groundwater depths identified in prior environmental studies. Groundwater was not evaluated as part of the Phase II ESI; however, prior studies indicate that regional groundwater flows to the south towards Coney Island Creek. Previous reports indicate that a sealed sheet-pile wall was previously installed surrounding the site, and on-site groundwater is isolated from the surrounding hydrogeologic environment.
- Soil Analytical Results:
 - The fill layer contains SVOCs at concentrations above the RUC and/or RUI SCOs. The presence of SVOCs is attributed to fill quality and historical site use. The presence of naphthalene is attributed to historical MGP operations at the site.
 - Native soil contains VOCs and SVOCs at concentrations above the RUC and/or RUI SCOs. The presence of petroleum-related VOCs and SVOCs is attributed to former MGP operations, including petroleum bulk storage, and at the site.
- Soil Vapor Analytical Results:
 - 1,1,1-TCA and PCE were detected in soil vapor at concentrations that yield NYSDOH decision matrix recommendations of “no further action”.
 - The presence of 1,1,1-TCA and PCE in soil vapor is attributed historical use of surrounding properties and former MGP operations at the site.

6.0 LIMITATIONS

This Phase II ESI Report was prepared expressly for Prologis, L.P. for the 2731 West 12th Street site and for the objectives defined herein. Langan shall not be responsible for interpretations by others of the information it develops or provides to Prologis, L.P. without specific written authorization from Langan.

REFERENCES

- Remedial Investigation Report (RIR) for the Brooklyn Borough Gas Works, Brooklyn New York, prepared by Ecology and Environment, Inc. (E&E), November 1997
- Record of Decision (ROD), Operable Unit 1: Plant Site, Former Brooklyn Borough Gas Works Site, Coney Island, Kings County, New York, Site Number 2-24-026, prepared by the NYSDEC, March 2001
- ROD, Operable Unit 2: Coney Island Creek, Former Brooklyn Borough Gas Works Site, Coney Island, Kings County, New York, Site Number 2-24-026, prepared by the NYSDEC, March 2002
- Remedial Action Report (RAR) for Operable Unit No. 1, Former Brooklyn Borough Gas Works Site Brooklyn, NY, Site Number 2-24-026, prepared by PS&S Engineering, July 2004
- Final Remedial Design Report (RDR) for Operable Units No. 2 and No. 3 Former Brooklyn Borough Gas Works Site, Brooklyn NY, prepared by PS&S, PC, March 2006
- Final Engineering Report (FER) for Operable Units No. 1, No. 2, and No. 3 (OU-1, 2 and 3) Former Brooklyn Borough Gas Works Site, Brooklyn New York, Site Number 2-24-026, prepared by PS&S, November 2009 (revised April 2013)
- Periodic Review Report (PRR), November 13, 2017 – November 13, 2018, Former Brooklyn Borough (Coney Island) Gas Works Site, Borough of Brooklyn, Kings County, New York, Site ID No. 2-24-026, prepared by GEI Consultants, December 2018
- Site Management Plan (SMP), Former Brooklyn Borough Gas Works Site, Kings County, Brooklyn, New York, prepared by GEI Consultants, June 26, 2019
- PRR, November 13, 2018 – November 13, 2019, Former Brooklyn Borough (Coney Island) Gas Works Site, Borough of Brooklyn, Kings County, New York, Site ID No. 2-24-026, prepared by GEI Consultants, December 2019
- PRR, November 13, 2019 – November 13, 2020, Former Brooklyn Borough (Coney Island) Gas Works Site, Borough of Brooklyn, Kings County, New York, Site ID No. 2-24-026, prepared by GEI Consultants, December 2020
- PRR, November 13, 2020 – November 13, 2021, Former Brooklyn Borough (Coney Island) Gas Works Site, Borough of Brooklyn, Kings County, New York, Site ID No. 2-24-026, prepared by GEI Consultants, December 2021
- PRR, November 13, 2021 – November 13, 2022, Former Brooklyn Borough (Coney Island) Gas Works Site, Borough of Brooklyn, Kings County, New York, Site ID No. 2-24-026, prepared by GEI Consultants, December 2022
- Phase II ESI Work Plan, 2731 West 12th Street, prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., September 30, 2022
- Draft Phase I ESA, 2731 West 12th Street, prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., January 4, 2023

FIGURES



WARNING: It is a violation of the NYS Education Law Article 145 for any person, unless acting under the direction of a licensed professional engineer, land surveyor or geologist, to alter this item in any way.

400 0 400
SCALE IN FEET

Notes:
1. Aerial imagery provided through Langan's subscription to NearMap.com, flown 07/19/2022.
2. Parcel data provided by the New York City Department of City Planning.

LANGAN

21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001-2727
T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
Langan International LLC

Collectively known as Langan

Project

2731 WEST 12TH STREET
BLOCK No. 7247, LOT No. 106
BROOKLYN

KINGS COUNTY

NEW YORK

Figure Title

SITE LOCATION MAP

Project No.
170697301

Date
5/11/2023

Scale
1"=400'

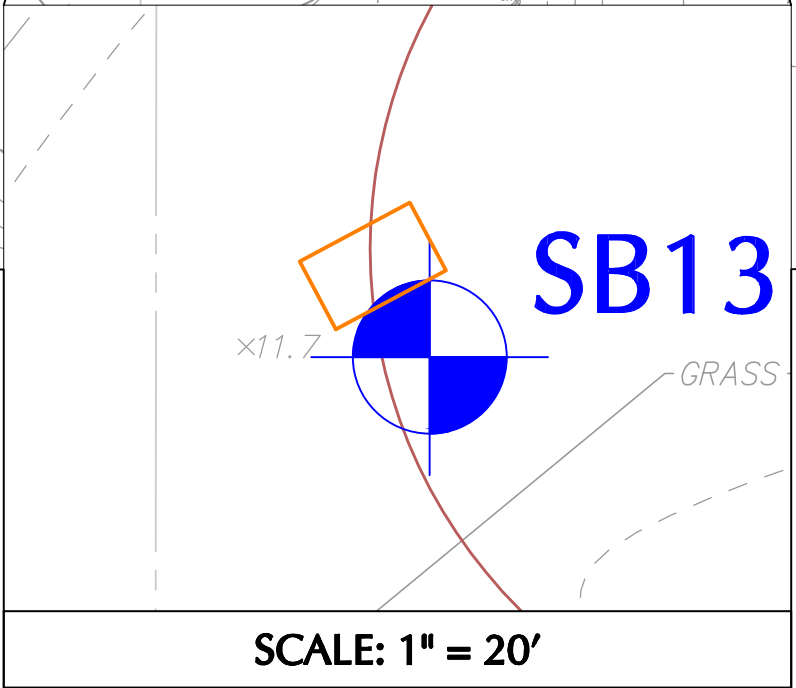
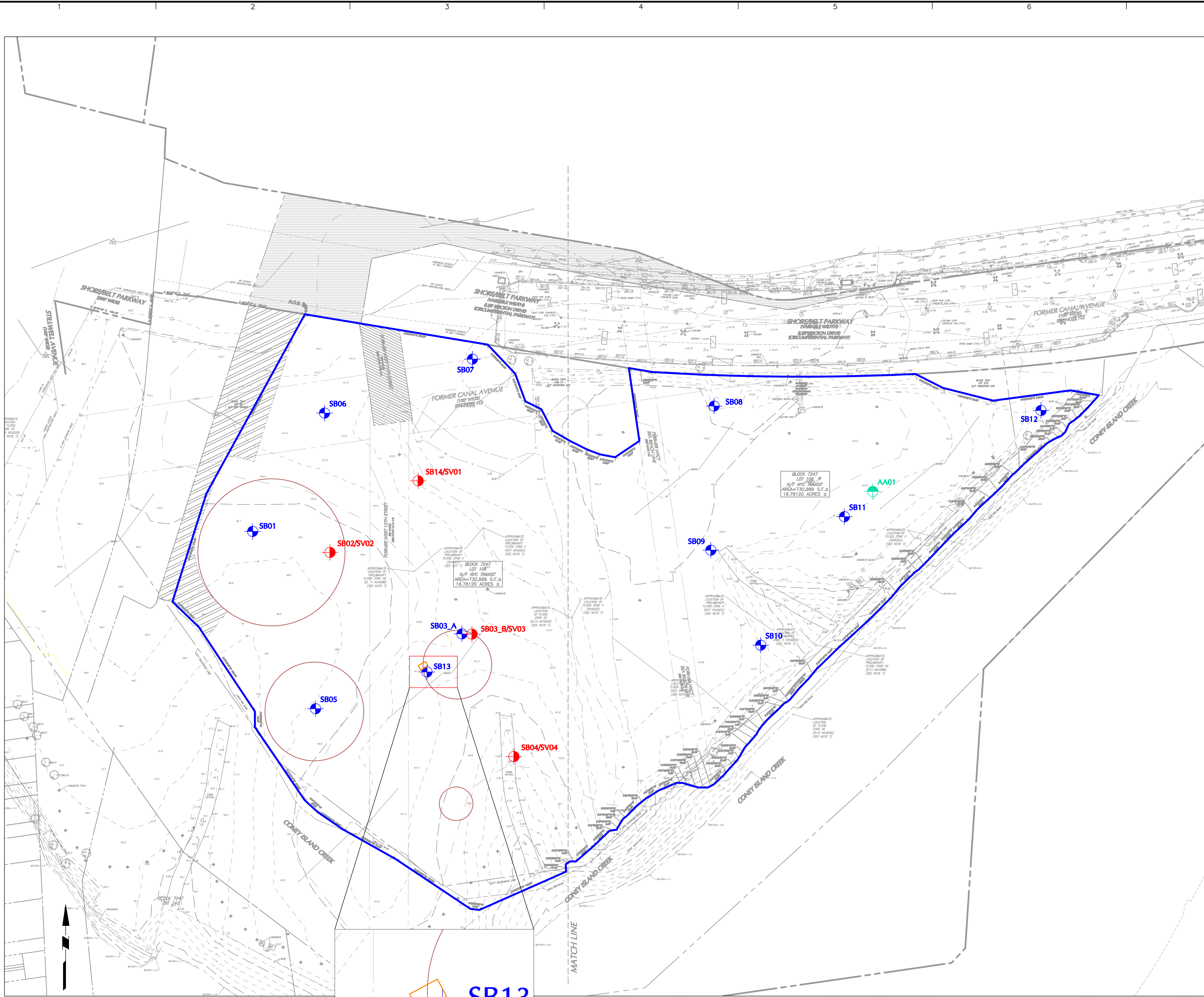
Drawn By
GS

Figure No.

1

Sheet 1 of 4

A
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C
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- LEGEND:
- APPROXIMATE SITE BOUNDARY
 - APPROXIMATE UST-LIKE ANOMALY LOCATION
 - APPROXIMATE FORMER MGP GAS HOLDER LOCATION
 - SOIL BORING LOCATION
 - SOIL BORING / SOIL VAPOR SAMPLE LOCATION
 - AMBIENT AIR SAMPLE LOCATION

- NOTES:
- BASE MAP REFERENCED FROM MAY 4, 2023 DRAFT ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN.
 - ALL FEATURES, SITE BOUNDARY, AND SAMPLE LOCATIONS ARE APPROXIMATE.
 - MGP = MANUFACTURED GAS PLANT
 - UST = UNDERGROUND STORAGE TANK
 - APPROXIMATE LOCATION AND DIMENSION OF ANOMALY RESEMBLING A POTENTIAL UST WERE TAKEN FROM IN-FIELD MEASUREMENTS COLLECTED BY LANGAN DURING THE PHASE II ENVIRONMENTAL SITE INVESTIGATION (MARCH 2023) AND THE GEOPHYSICAL ENGINEERING SURVEY REPORT PREPARED BY NOVA GEOPHYSICAL ENGINEERING SERVICES, DATED MARCH 31, 2023.
 - APPROXIMATE FORMER MGP GAS HOLDER LOCATIONS TAKEN FROM THE SITE MANAGEMENT PLAN PREPARED BY GEI CONSULTANTS, INC., P.C., DATED JUNE 2019.

WARNING:
IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

LANGAN

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

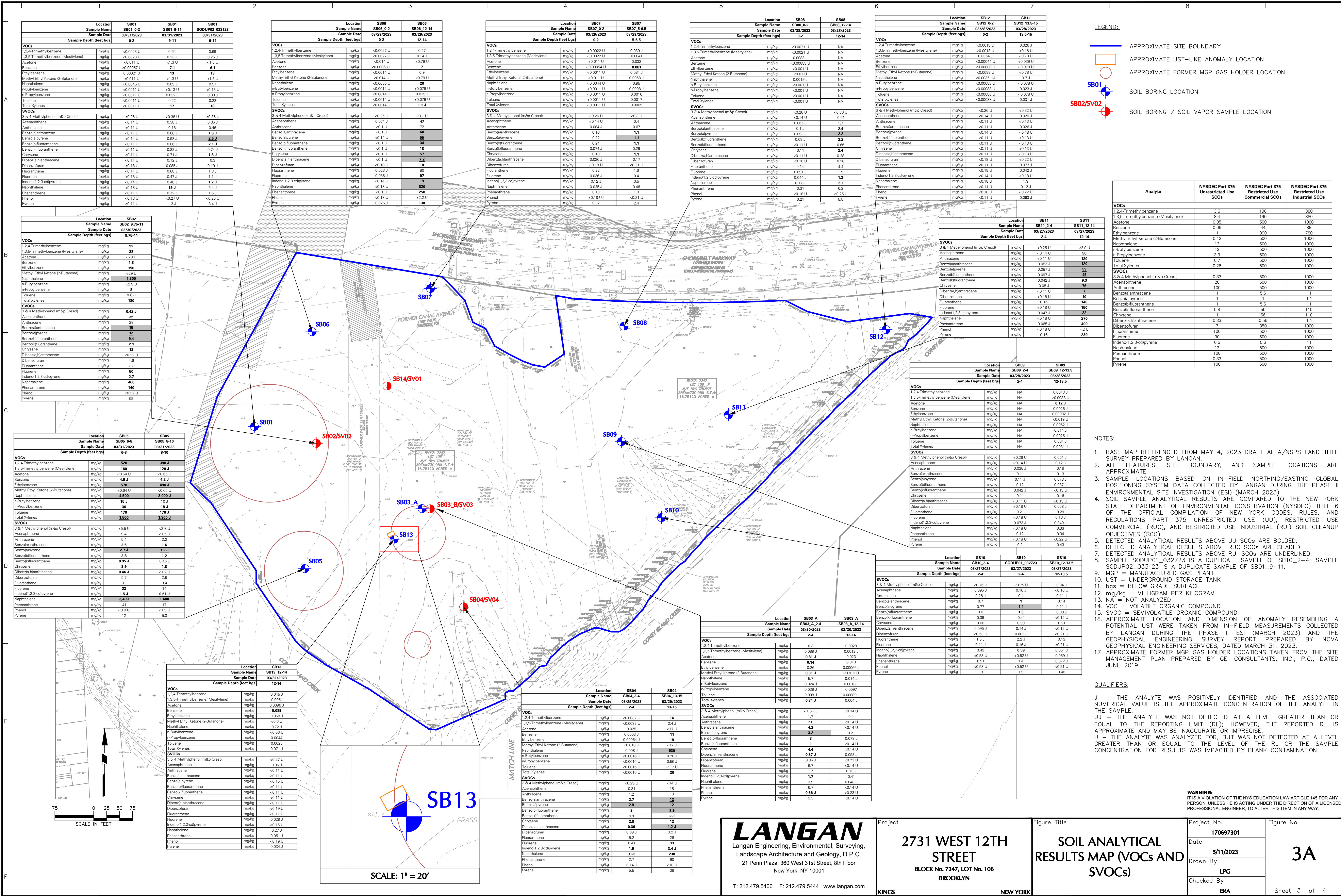
Project
2731 WEST 12TH STREET
BLOCK No. 7247, LOT No. 106
BROOKLYN
NEW YORK

KINGS

Figure Title
SAMPLE LOCATION MAP

Project No.
170697301
Date
5/11/2023
Drawn By
LPG
Checked By
ERA

Figure No.
2
Sheet 2 of 4



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LANEAN
PROJECT NO. 170697301

Location		SB06	SB06
Sample Name		SB06 0-2	SB06 12-14
Sample Date		03/29/2023	03/29/2023
Sample Depth (feet bgs)		0-2	12-14
Metals			
Chromium, Trivalent	mg/kg	23.8	3.88
Copper	mg/kg	20.3	4.85
Lead	mg/kg	12.2	5.35
Mercury	mg/kg	<0.068 U	<0.083 U
Nickel	mg/kg	11.1	3.66
Zinc	mg/kg	57.3	9.24

Location		SB07	SB07
Sample Name		SB07 0-2	SB07 5-6.5
Sample Date		03/29/2023	03/29/2023
Sample Depth (feet bgs)		0-2	5-6.5
Metals			
Chromium, Trivalent	mg/kg	14.6	35.4
Copper	mg/kg	33	152
Lead	mg/kg	86	263
Mercury	mg/kg	<0.07 U	0.611
Nickel	mg/kg	28.2	25.8
Zinc	mg/kg	129	306

Location		SB08	SB08
Sample Name		SB08 0-2	SB08 12-14
Sample Date		03/28/2023	03/28/2023
Sample Depth (feet bgs)		0-2	12-14
Pesticides			
4,4'-DDD	mg/kg	<0.00174 UJ	NA
4,4'-DDE	mg/kg	0.00139 J	NA
4,4'-DDT	mg/kg	<0.00174 UJ	NA
Metals			
Chromium, Trivalent	mg/kg	21.7	12.6 J
Copper	mg/kg	36.5	43
Lead	mg/kg	4.47	54.7
Mercury	mg/kg	<0.07 U	0.147
Nickel	mg/kg	20.3	13.6
Zinc	mg/kg	51.4	46.5

Location		SB12	SB12
Sample Name		SB12 0-2	SB12 13.5-15
Sample Date		03/28/2023	03/28/2023
Sample Depth (feet bgs)		0-2	13.5-15
Pesticides			
4,4'-DDD	mg/kg	<0.00173 UJ	NA
4,4'-DDE	mg/kg	0.000824 J	NA
4,4'-DDT	mg/kg	<0.00173 UJ	NA
Metals			
Chromium, Trivalent	mg/kg	32.6	10.8
Copper	mg/kg	43.5	3.89
Lead	mg/kg	2.96 J	4.46 J
Mercury	mg/kg	<0.071 U	<0.086 U
Nickel	mg/kg	29.6	8.4
Zinc	mg/kg	68.6	19.9

Location		SB01	SB01	SB01
Sample Name		SB01 0-2	SB01 9-11	SODUP02 033123
Sample Date		03/31/2023	03/31/2023	03/31/2023
Sample Depth (feet bgs)		0-2	9-11	9-11
Metals				
Chromium, Trivalent	mg/kg	24.8	16.7 J	8.52 J
Copper	mg/kg	19.3	12 J	21.2 J
Lead	mg/kg	9.64	28.5 J	42.8 J
Mercury	mg/kg	<0.078 U	<0.105 U	0.08 J
Nickel	mg/kg	14.7	18	13.3
Zinc	mg/kg	53.4	55.2	47.6

Location		SB02
Sample Name		SB02 9.75-11
Sample Date		03/30/2023
Sample Depth (feet bgs)		9.75-11
Metals		
Chromium, Trivalent	mg/kg	16.4 J
Copper	mg/kg	23.2
Lead	mg/kg	42.5
Mercury	mg/kg	0.257
Nickel	mg/kg	23.2
Zinc	mg/kg	75.6

Location		SB03_A	SB03_A
Sample Name		SB03_A 2-4	SB03_A 12-14
Sample Date		03/30/2023	03/30/2023
Sample Depth (feet bgs)		2-4	12-14
Metals			
Chromium, Trivalent	mg/kg	37 J	7.88 J
Copper	mg/kg	149	2.77
Lead	mg/kg	279	3.06 J
Mercury	mg/kg	0.686	<0.101 U
Nickel	mg/kg	21.3	7.11
Zinc	mg/kg	267	12.6

Location		SB05	SB05
Sample Name		SB05 6-8	SB05 8-10
Sample Date		03/31/2023	03/31/2023
Sample Depth (feet bgs)		6-8	8-10
Metals			
Chromium, Trivalent	mg/kg	2.91	4.39
Copper	mg/kg	1.52	1.61
Lead	mg/kg	10.5	1.73 J
Mercury	mg/kg	0.068 J	<0.076 U
Nickel	mg/kg	4.55	4.86
Zinc	mg/kg	15.4	7.27

Location		SB04	SB04
Sample Name		SB04 2-4	SB04 13-15
Sample Date		03/29/2023	03/29/2023
Sample Depth (feet bgs)		2-4	13-15
Metals			
Chromium, Trivalent	mg/kg	26.5	10.1
Copper	mg/kg	74.8	3.94
Lead	mg/kg	187	3.18 J
Mercury	mg/kg	0.424	<0.08 U
Nickel	mg/kg	19	6.4
Zinc	mg/kg	238	16

Location		SB11	SB11
Sample Name		SB11 2-4	SB11 12-14
Sample Date		03/27/2023	03/27/2023
Sample Depth (feet bgs)		2-4	12-14
Pesticides			
4,4'-DDD	mg/kg	0.00172 J	NA
4,4'-DDE	mg/kg	0.00134 J	NA
4,4'-DDT	mg/kg	0.00268 J	NA
Metals			
Chromium, Trivalent	mg/kg	12.4	27.8
Copper	mg/kg	19.2	79.3
Lead	mg/kg	40.7	61
Mercury	mg/kg	0.072 J	0.206
Nickel	mg/kg	43.5	24.4
Zinc	mg/kg	75.6	35.8

Location		SB09	SB09
Sample Name		SB09 2-4	SB09 12-13.5
Sample Date		03/28/2023	03/28/2023
Sample Depth (feet bgs)		2-4	12-13.5
Pesticides			
4,4'-DDD	mg/kg	0.00542 J	NA
4,4'-DDE	mg/kg	<0.0017 UJ	NA
4,4'-DDT	mg/kg	<0.0017 UJ	NA
Metals			
Chromium, Trivalent	mg/kg	34.8	16 J
Copper	mg/kg	41.2	59.2
Lead	mg/kg	22.1	82.4
Mercury	mg/kg	<0.07 U	0.134
Nickel	mg/kg	37.2	23.8
Zinc	mg/kg	58.8	180

Location		SB10	SB10	SB10
Sample Name		SB10 2-4	SODUP01 032723	SB10 12-13.5
Sample Date		03/27/2023	03/27/2023	03/27/2023
Sample Depth (feet bgs)		2-4	2-4	12-13.5
Pesticides				
4,4'-DDD	mg/kg	0.0124	0.0136 J	NA
4,4'-DDE	mg/kg	0.014	0.0153 J	NA
4,4'-DDT	mg/kg	0.0187 J	0.0187 J	NA
Metals				
Chromium, Trivalent	mg/kg	15.1 J	17.6	11.6
Copper	mg/kg	32.2	31.4	20.7
Lead	mg/kg	113	111	33
Mercury	mg/kg	0.174	0.173	0.061 J
Nickel	mg/kg	37.5	36.6	33.1
Zinc	mg/kg	119	128	73.3

LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE UST-LIKE ANOMALY LOCATION
- APPROXIMATE FORMER MGP GAS HOLDER LOCATION
- SOIL BORING LOCATION
- SOIL BORING / SOIL VAPOR SAMPLE LOCATION

NOTES:

- BASE MAP REFERENCED FROM MAY 4, 2023 DRAFT ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN.
- ALL FEATURES, SITE BOUNDARY, AND SAMPLE LOCATIONS ARE APPROXIMATE.
- SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS PART 375 UNRESTRICTED USE (UU), RESTRICTED USE COMMERCIAL (RUC), AND RESTRICTED USE INDUSTRIAL (RUI) SOIL CLEANUP OBJECTIVES (SCO).
- DETECTED ANALYTICAL RESULTS ABOVE UU SCO_s ARE BOLDED.
- SAMPLE SODUP01_032723 IS A DUPLICATE SAMPLE OF SB10_2-4; SAMPLE SODUP02_033123 IS A DUPLICATE SAMPLE OF SB01_9-11.
- MGP = MANUFACTURED GAS PLANT
- UST = UNDERGROUND STORAGE TANK
- bgs = BELOW GRADE SURFACE
- mg/kg = MILLIGRAM PER KILOGRAM
- NA = NOT ANALYZED
- APPROXIMATE LOCATION AND DIMENSION OF ANOMALY RESEMBLING A POTENTIAL UST WERE TAKEN FROM IN-FIELD MEASUREMENTS COLLECTED BY LANGAN DURING THE PHASE II ENVIRONMENTAL SITE INVESTIGATION (MARCH 2023) AND THE GEOPHYSICAL ENGINEERING SURVEY REPORT PREPARED BY NOVA GEOPHYSICAL ENGINEERING SERVICES, DATED MARCH 31, 2023.
- APPROXIMATE FORMER MGP GAS HOLDER LOCATIONS TAKEN FROM THE SITE MANAGEMENT PLAN PREPARED BY GEI CONSULTANTS, INC., P.C., DATED JUNE 2019.

QUALIFIERS:

J – THE ANALYTE WAS POSITIVELY IDENTIFIED AND THE ASSOCIATED NUMERICAL VALUE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE.
UJ – THE ANALYTE WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL); HOWEVER, THE REPORTED RL IS APPROXIMATE AND MAY BE INACCURATE OR IMPRECISE.
U – THE ANALYTE WAS ANALYZED FOR, BUT WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE LEVEL OF THE RL OR THE SAMPLE CONCENTRATION FOR RESULTS WAS IMPACTED BY BLANK CONTAMINATION.

WARNING:
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LANGAN

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project

**2731 WEST 12TH
STREET**
BLOCK No. 7247, LOT No. 106
BROOKLYN

KINGS

NEW YORK

Figure Title

**SOIL ANALYTICAL
RESULTS MAP
(METALS AND PESTICIDES)**

Project No.

170697301

Date

5/11/2023

Drawn By

LPG

Checked By

ERA

Figure No.

3B

Sheet 4 of 4

Filename: \\langan.com\data\NYC\data\3170697301\Project Data\CAD\01\SheetFiles\Phase II BLP\Phase II Soil Analytical Results.dwg Date: 5/11/2023 Time: 18:26 User: lgrose Style Table: Langan.sbt Layout: Metals And Pests

TABLES

Table 1
Phase II Environmental Site Investigation
Sample Collection Summary

2731 West 12th Street
Brooklyn, New York
Langan Project No: 170697301

No.	Sample Location	Sample ID	Sample Interval (feet bgs)	Sample Date	Analyses
Soil Samples					
1	SB01	SB01_0-2	0-2	3/31/2023	Part 375/TCL VOCs, SVOCs, PCBs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
2		SB01_9-11	9-11	3/31/2023	
3	SB02	SB02_9.75-11	9.75-11	3/30/2023	Part 375/TCL VOCs, SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
4	SB03	SB03_2-4	2-4	3/30/2023	Part 375/TCL VOCs, SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
5		SB03_12-14	12-14	3/30/2023	
6	SB04	SB04_2-4	2-4	3/29/2023	Part 375/TCL VOCs, SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
7		SB04_13-15	13-15	3/29/2023	
8	SB05	SB05_6-8	6-8	3/31/2023	Part 375/TCL VOCs, SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
9		SB05_8-10	8-10	3/31/2023	
10	SB06	SB06_0-2	0-2	3/29/2023	Part 375/TCL VOCs, SVOCs, PCBs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
11		SB06_12-14	12-14	3/29/2023	
12	SB07	SB07_0-2	0-2	3/29/2023	Part 375/TCL VOCs, SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
13		SB07_5-6.5	5-6.5	3/29/2023	
14	SB08	SB08_0-2	0-2	3/28/2023	Part 375/TCL VOCs, SVOCs, Pesticides/Herbicides, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
15		SB08_12-14	12-14	3/28/2023	Part 375/TCL SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
16	SB09	SB09_2-4	2-4	3/28/2023	Part 375/TCL SVOCs, Pesticides/Herbicides, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
17		SB09_12-13.5	12-13.5	3/28/2023	Part 375/TCL VOCs, SVOCs and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
18	SB10	SB10_2-4	2-4	3/27/2023	Part 375/TCL SVOCs, Pesticides/Herbicides, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
19		SB10_12-13.5	12-13.5	3/27/2023	Part 375/TCL SVOCs and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
20	SB11	SB11_2-4	2-4	3/27/2023	Part 375/TCL SVOCs, Pesticides/Herbicides, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
21		SB11_12-14	12-14	3/27/2023	Part 375/TCL SVOCs and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
22	SB12	SB12_0-2	0-2	3/28/2023	Part 375/TCL VOCs, SVOCs, Pesticides/Herbicides, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
23		SB12_13.5-15	13.5-15	3/28/2023	Part 375/TCL VOCs, SVOCs and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
24	SB13	SB13_12-14	12-14	3/31/2023	Part 375 VOCs, SVOCs
Soil QA/QC					
No.	QA/QC Sample Type	Sample ID	Parent Sample	Sample Date	Analyses
1	Duplicate	SODUP01_032723	SB10_2-4	3/27/2023	Part 375/TCL SVOCs, Pesticides/Herbicides, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
2		SODUP02_033123	SB01_9-11	3/31/2023	Part 375/TCL VOCs, SVOCs, PCBs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
3	MS/MSD	SB06_0-2	SB06_0-2	3/29/2023	Part 375/TCL VOCs, SVOCs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
4		SB01_0-2	SB01_0-2	3/31/2023	Part 375/TCL VOCs, SVOCs, PCBs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
5	Field Blank	SOFB01_032823	NA	3/28/2023	Part 375/TCL VOCs, SVOCs, Pesticides/Herbicides, PCBs, and Part 375/TAL Metals including hexavalent and trivalent chromium, total cyanide
6		SOFB02_033123	NA	3/30/2023	
7	Trip Blank	TB01_032823	NA	3/28/2023	Part 375/TCL VOCs
8		TB02_033123	NA	3/30/2023	
Soil Vapor and Ambient Air Samples					
No.	Sample Location	Sample ID	Sample Interval (feet bgs)	Sample Date	Analyses
1	SV01	SV01_033023	6	3/30/2023	VOCs by USEPA TO-15
2	SV02	SV02_033023	7	3/30/2023	
3	SV03	SV03_033023	2.5	3/30/2023	
4	SV04	SV04_033023	5.5	3/30/2023	
5	AA01	AA01_033023	3 to 5 feet ags	3/30/2023	VOCs by USEPA TO-15

- Notes:**
- 1. Part 375 = Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (6 NYCRR) New York State Department of Environmental Conservation (NYSDEC) Part 375
 - 2. TCL = Target Compound List
 - 3. VOC = Volatile organic compound
 - 4. SVOC = Semivolatile organic compound
 - 5. PCB = Polychlorinated biphenyl
 - 6. TAL = Target Analyte List
 - 7. QA/QC - Quality assurance/quality control
 - 8. bgs = below grade surface
 - 9. ags = above grade surface
 - 10. USEPA = United States Environmental Protection Agency

Table 2
Phase II Environmental Site Investigation Report
Soil Sample Analytical Results

2731 West 12th Street
Brooklyn, New York

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	NYSDEC Part 375 Restricted Use Industrial SCOs	Location		SB01	SB01	SB01	SB02	SB03_A	SB03_A	SB04	SB04	SB05	SB05	SB06	SB06	SB07	SB07															
					Sample Name		SB01_0-2	SB01_9-11	SODUP02_033123	SB02_9.75-11	SB03_A_2-4	SB03_A_12-14	SB04_2-4	SB04_13-15	SB05_6-8	SB05_8-10	SB06_0-2	SB06_12-14	SB07_0-2	SB07_5-6.5															
					Sample Date		03/31/2023	03/31/2023	03/31/2023	03/30/2023	03/30/2023	03/30/2023	03/29/2023	03/29/2023	03/31/2023	03/31/2023	03/29/2023	03/29/2023	03/29/2023	03/29/2023															
					Sample Depth		0-2	9-11	9-11	9.75-11	2-4	12-14	2-4	13-15	6-8	8-10	0-2	12-14	0-2	5-6.5															
																					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds																																			
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	mg/kg	<0.00057 U	<0.066 U	<0.065 U	<1.4 U	<0.00079 U	<0.00064 U	<0.00079 U	<0.85 U	<0.032 U	<0.032 U	<0.00068 U	<0.04 U	<0.00054 U	<0.00083 U																
1,1,1-Trichloroethane	71-55-6	0.68	500	1000	mg/kg	<0.00057 U	<0.066 U	<0.065 U	<1.4 U	<0.00079 U	<0.00064 U	<0.00079 U	<0.85 U	<0.032 U	<0.032 U	<0.00068 U	<0.04 U	<0.00054 U	<0.00083 U																
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	NS	mg/kg	<0.00057 U	<0.066 U	<0.065 U	<1.4 U	<0.00079 U	<0.00064 U	<0.00079 U	<0.85 U	<0.032 U	<0.032 U	<0.00068 U	<0.04 U	<0.00054 U	<0.00083 U																
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	mg/kg	<0.0011 U	<0.13 U	<0.13 U	<2.9 U	<0.0016 U	<0.0013 U	<0.0016 U	<1.7 U	<0.064 U	<0.065 U	<0.0014 U	<0.079 U	<0.0011 U	<0.0016 U																
1,1-Dichloroethane	75-34-3	0.27	240	480	mg/kg	<0.0011 U	<0.13 U	<0.13 U	<2.9 U	<0.0016 U	<0.0013 U	<0.0016 U	<1.7 U	<0.064 U	<0.065 U	<0.0014 U	<0.079 U	<0.0011 U	<0.0016 U																
1,1-Dichloroethene	75-35-4	0.33	500	1000	mg/kg	<0.0011 U	<0.13 U	<0.13 U	<2.9 U	<0.0016 U	<0.0013 U	<0.0016 U	<1.7 U	<0.064 U	<0.065 U	<0.0014 U	<0.079 U	<0.0011 U	<0.0016 U																
1,1-Dichloropropene	563-58-6	NS	NS	NS	mg/kg	<0.00057 U	<0.066 U	<0.065 U	<1.4 U	<0.00079 U	<0.00064 U	<0.00079 U	<0.85 U	<0.032 U	<0.032 U	<0.00068 U	<0.04 U	<0.00054 U	<0.00083 U																
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
1,2,3-Trichloropropane	96-18-4	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	6.3	0.12 J	0.027	<0.0032 U	2 J	15 J	14 J	<0.0027 U	0.023 J	<0.0022 U	0.031 J																
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	0.00063 J	<0.0026 UJ	<0.0032 UJ	<3.4 U	<0.13 U	<0.13 U	<0.0027 UJ	<0.16 UJ	<0.0022 UJ	0.00052 J																
1,2,4-Trimethylbenzene	95-63-6	3.6	190	380	mg/kg	<0.0023 U	0.64	0.69	92	0.3	0.0028	<0.0032 U	14	520	390 J	<0.0027 U	0.57	<0.0022 U	0.039 J																
1,2-Dibromo-3-Chloropropane	96-12-8	NS	NS	NS	mg/kg	<0.0034 U	<0.4 U	<0.39 U	<8.6 U	<0.0047 U	<0.0038 U	<0.0048 U	<5.1 U	<0.19 U	<0.19 U	<0.0041 U	<0.24 U	<0.0033 U	<0.005 U																
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	NS	NS	mg/kg	<0.0011 U	<0.13 U	<0.13 U	<2.9 U	<0.0016 U	<0.0013 U	<0.0016 U	<1.7 U	<0.064 U	<0.065 U	<0.0014 U	<0.079 U	<0.0011 U	<0.0016 U																
1,2-Dichlorobenzene	95-50-1	1.1	500	1000	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	0.0016 J	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	0.00058 J																
1,2-Dichloroethane	107-06-2	0.02	30	60	mg/kg	<0.0011 U	<0.13 U	<0.13 U	<2.9 U	<0.0016 U	<0.0013 U	<0.0016 U	<1.7 U	<0.064 U	<0.065 U	<0.0014 U	<0.079 U	<0.0011 U	<0.0016 U																
1,2-Dichloropropane	78-87-5	NS	NS	NS	mg/kg	<0.0011 U	<0.13 U	<0.13 U	<2.9 U	<0.0016 U	<0.0013 U	<0.0016 U	<1.7 U	<0.064 U	<0.065 U	<0.0014 U	<0.079 U	<0.0011 U	<0.0016 U																
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	190	380	mg/kg	<0.0023 U	0.23 J	0.25 J	28	0.089 J	0.0012 J	<0.0032 U	2.4 J	160	120 J	<0.0027 U	0.14 J	<0.0022 U	0.0041																
1,3-Dichlorobenzene	541-73-1	2.4	280	560	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	0.0005 J	<0.0032 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
1,3-Dichloropropane	142-28-9	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
1,4-Dichlorobenzene	106-46-7	1.8	130	250	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	0.024 J	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	0.00067 J																
1,4-Diethyl Benzene	105-05-5	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	0.1 J	0.0051	<0.0032 U	2.2 J	83	60 J	<0.0027 U	0.024 J	<0.0022 U	0.045 J																
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	130	250	mg/kg	<0.092 U	<10 U	<10 U	<230 U	<0.13 U	<0.1 U	<0.13 U	<140 U	<5.1 U	<5.2 U	<0.11 U	<6.3 U	<0.087 U	<0.13 U																
2,2-Dichloropropane	594-20-7	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
2-Chlorotoluene	95-49-8	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
2-Hexanone (MBK)	591-78-6	NS	NS	NS	mg/kg	<0.011 U	<1.3 U	<1.3 U	<29 U	<0.016 U	<0.013 U	<0.016 U	<1.7 U	<0.64 U	<0.65 U	<0.014 U	<0.79 U	<0.011 U	<0.016 U																
4-Chlorotoluene	106-43-4	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
4-Ethyltoluene	622-96-8	NS	NS	NS	mg/kg	<0.0023 U	1.1	1.1	150	0.19 J	0.0023 J	<0.0032 U	7.2	390	300 J	<0.0027 U	0.12 J	<0.0022 U	0.059 J																
Acetone	67-64-1	0.05	500	1000	mg/kg	<0.011 U	<1.3 U	<1.3 U	<29 U	0.81 J	0.023	0.025	<17 U	<0.64 U	<0.65 U	<0.014 U	<0.79 U	<0.011 U	0.032																
Acrylonitrile	107-13-1	NS	NS	NS	mg/kg	<0.0046 U	<0.53 U	<0.52 U	<11 U	<0.0063 U	<0.0051 U	<0.0063 U	<6.8 U	<0.26 U	<0.26 U	<0.0055 U	<0.32 U	<0.0044 U	<0.0066 U																
Benzene	71-43-2	0.06	44	89	mg/kg	<0.00057 U	7.1	6.1	1.8	0.14	0.018	0.0003 J	11	4.9 J	4.2 J	<0.00068 U	7	<0.00054 U	0.081																
Bromobenzene	108-86-1	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U	<0.0033 U																
Bromochloromethane	74-97-5	NS	NS	NS	mg/kg	<0.0023 U	<0.26 U	<0.26 U	<5.7 U	<0.0032 U	<0.0026 U	<0.0032 U	<3.4 U	<0.13 U	<0.13 U	<0.0027 U	<0.16 U	<0.0022 U																	

Table 2
Phase II Environmental Site Investigation Report
Soil Sample Analytical Results

2731 West 12th Street
Brooklyn, New York

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	NYSDEC Part 375 Restricted Use Industrial SCOs	Location	SB01	SB01	SB01	SB02	SB03_A	SB03_A	SB04	SB04	SB05	SB05	SB06	SB06	SB07	SB07
					Sample Name	SB01_0-2	SB01_9-11	SODUP02_033123	SB02_9.75-11	SB03_A_2-4	SB03_A_12-14	SB04_2-4	SB04_13-15	SB05_6-8	SB05_8-10	SB06_0-2	SB06_12-14	SB07_0-2	SB07_5-6.5
					Sample Date	03/31/2023	03/31/2023	03/31/2023	03/30/2023	03/30/2023	03/30/2023	03/29/2023	03/29/2023	03/31/2023	03/31/2023	03/29/2023	03/29/2023	03/29/2023	03/29/2023
					Sample Depth	0-2	9-11	9-11	9.75-11	2-4	12-14	2-4	13-15	6-8	8-10	0-2	12-14	0-2	5-6.5
Semi-Volatile Organic Compounds																			
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
1,2-Dichlorobenzene	95-50-1	1.1	500	1000	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
1,3-Dichlorobenzene	541-73-1	2.4	280	560	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
1,4-Dichlorobenzene	106-46-7	1.8	130	250	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	130	250	mg/kg	<0.027 UJ	<0.04 UJ	<0.038 UJ	<0.056 U	<0.15 U	<0.035 U	<0.03 UJ	<1.5 U	<0.57 UJ	<0.29 UJ	<0.026 U	<0.33 U	<0.027 U	<0.031 U
2,4,5-Trichlorophenol	95-95-4	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	mg/kg	<0.11 U	<0.16 U	<0.15 U	<0.22 U	<0.61 UJ	<0.14 U	<0.12 U	<6 U	<2.3 U	<1.2 U	<0.1 U	<1.3 U	<0.11 U	<0.12 U
2,4-Dichlorophenol	120-83-2	NS	NS	NS	mg/kg	<0.16 U	<0.24 U	<0.23 U	<0.33 U	<0.92 UJ	<0.21 U	<0.18 U	<9.1 U	<3.4 U	<1.7 U	<0.16 U	<2 U	<0.16 U	<0.19 U
2,4-Dimethylphenol	105-67-9	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2,4-Dinitrophenol	51-28-5	NS	NS	NS	mg/kg	<0.87 U	<1.3 U	<1.2 U	<1.8 U	<4.9 UJ	<1.1 U	<0.98 U	<48 U	<18 U	<9.3 U	<0.84 U	<10 U	<0.87 U	<1 U
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2,6-Dinitrotoluene	606-20-2	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2-Chloronaphthalene	91-58-7	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2-Chlorophenol	95-57-8	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2-Methylnaphthalene	91-57-6	NS	NS	NS	mg/kg	<0.22 U	0.67	0.3	140	2.4	<0.28 U	0.33	130	860	350	<0.21 U	440	<0.22 U	0.36
2-Methylphenol (o-Cresol)	95-48-7	0.33	500	1000	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2-Nitroaniline	88-74-4	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
2-Nitrophenol	88-75-5	NS	NS	NS	mg/kg	<0.39 U	<0.58 U	<0.54 U	<0.8 U	<2.2 UJ	<0.5 U	<0.44 U	<22 U	<8.2 U	<4.2 U	<0.38 U	<4.7 U	<0.39 U	<0.45 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	500	1000	mg/kg	<0.26 U	<0.38 U	<0.36 U	0.42 J	<1.5 UJ	<0.34 U	<0.29 U	<14 U	<5.5 U	<2.8 U	<0.25 U	<3.1 U	<0.26 U	<0.3 U
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
3-Nitroaniline	99-09-2	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	NS	mg/kg	<0.47 U	<0.69 U	<0.66 U	<0.96 U	<2.6 UJ	<0.6 U	<0.53 U	<26 U	<9.9 U	<5 U	<0.46 U	<5.7 U	<0.47 U	<0.54 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
4-Chloro-3-Methylphenol	59-50-7	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 UJ	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
4-Chloroaniline	106-47-8	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 UJ	<3.8 U	<1.9 U	<0.18 UJ	<2.2 UJ	<0.18 U	<0.21 UJ
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
4-Nitroaniline	100-01-6	NS	NS	NS	mg/kg	<0.18 U	<0.27 U	<0.25 U	<0.37 U	<1 U	<0.23 U	<0.2 U	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
4-Nitrophenol	100-02-7	NS	NS	NS	mg/kg	<0.25 U	<0.37 U	<0.35 U	<0.52 U	<1.4 UJ	<0.32 U	<0.28 U	<14 U	<5.3 U	<2.7 U	<0.24 U	<3 U	<0.25 U	<0.29 U
Acenaphthene	83-32-9	20	500	1000	mg/kg	<0.14 U	0.38 J	0.85 J	35	1.7	0.4	0.31	18	9.4	<1.5 U	0.071 J	47	<0.14 U	0.4
Acenaphthylene	208-96-8	100	500	1000	mg/kg	<0.14 U	0.38 J	0.94 J	6.6	1.8	0.072 J	0.46	9.2	60	26	0.2	100	0.2	1.1
Acetophenone	98-86-2	NS	NS	NS	mg/kg	<0.18 U	0.1 J	0.11 J	<0.37 U	<1 U	<0.23 U	0.038 J	<10 U	<3.8 U	<1.9 U	<0.18 U	<2.2 U	<0.18 U	<0.21 U
Anthracene	120-12-7	100	500	1000	mg/kg	<0.11 U	0.18	0.46	28	2.8	<0.14 U	1.2	13	5.4	2.2	<0.1 U	72	0.084 J	0.67
Benzo(a)anthracene	56-55-3	1	5.6	11	mg/kg	<0.11 U	0.66 J	1.6 J	15	4.2	<0.14 U	2.7	12	3.5	1.6	<0.1 U	60	0.16	1.1
Benzo(a)pyrene	50-32-8	1	1	1.1	mg/kg	<0.14 U	0.98 J	2.5 J	12	3.2	0.21	2.9	12	2.7 J	1.2 J	<0.14 U	55	0.22	1.1
Benzo(b)fluoranthene	205-99-2	1	5.6	11	mg/kg	<0.11 U	0.86 J	2.1 J	9.4	3	0.073 J	3	8.9	2.8	1.2	<0.1 U	34	0.24	1.1
Benzo(g,h,i)Perylene	191-24-2	100	500	1000	mg/kg	<0.14 U	0.47 J	1.1 J	3	1.8	0.7	1.3	3.6 J	1.6 J	0.66 J	<0.14 U	28	0.16	0.68
Benzo(k)fluoranthene	207-08-9	0.8	56	110	mg/kg	<0.11 U	0.32 J	0.74 J	2.1	1	<0.14 U	1.1	2 J	0.95 J	0.46 J	<0.1 U	18	0.074 J	0.

Table 2
Phase II Environmental Site Investigation Report
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Brooklyn, New York

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	NYSDEC Part 375 Restricted Use Industrial SCOs	Location	SB01	SB01	SB01	SB02	SB03_A	SB03_A	SB04	SB04	SB05	SB05	SB06	SB06	SB07	SB07
					Sample Name	SB01_0-2	SB01_9-11	SODUP02_033123	SB02_9.75-11	SB03_A_2-4	SB03_A_12-14	SB04_2-4	SB04_13-15	SB05_6-8	SB05_8-10	SB06_0-2	SB06_12-14	SB07_0-2	SB07_5-6.5
					Sample Date	03/31/2023	03/31/2023	03/31/2023	03/30/2023	03/30/2023	03/30/2023	03/29/2023	03/29/2023	03/31/2023	03/31/2023	03/29/2023	03/29/2023	03/29/2023	03/29/2023
					Sample Depth	0-2	9-11	9-11	9.75-11	2-4	12-14	2-4	13-15	6-8	8-10	0-2	12-14	0-2	5-6.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
Pesticides																			
4,4'-DDD	72-54-8	0.0033	92	180	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	72-55-9	0.0033	62	120	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	50-29-3	0.0033	47	94	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	309-00-2	0.005	0.68	1.4	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.02	3.4	6.8	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha Chlordane	5103-71-9	0.094	24	47	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha Endosulfan	959-98-8	2.4	200	920	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	3	14	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beta Endosulfan	33213-65-9	2.4	200	920	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlordane (alpha and gamma)	57-74-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	500	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	60-57-1	0.005	1.4	2.8	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	1031-07-8	2.4	200	920	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	72-20-8	0.014	89	410	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Aldehyde	7421-93-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	53494-70-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma Bhc (Lindane)	58-89-9	0.1	9.2	23	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma Chlordane (Trans)	5103-74-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	76-44-8	0.042	15	29	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024-57-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	72-43-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	8001-35-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Herbicides																			
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silvex (2,4,5-Tp)	93-72-1	3.8	500	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyl																			
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	NS	mg/kg	0.0047 J	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	NS	mg/kg	<0.0356 U	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
Total PCBs	1336-36-3	0.1	1	25	mg/kg	0.0047 J	<0.0535 U	<0.0485 U	NA	NA	NA	NA	NA	NA	NA	<0.0348 U	<0.0436 U	NA	NA
Metals																			
Aluminum	7429-90-5	NS	NS	NS	mg/kg	12,200	7,500 J	2,680 J	7,420	7,080	3,420	6,440	4,360	1,270	1,460	11,200	1,290	6,770	7,350
Antimony	7440-36-0	NS	NS	NS	mg/kg	<4.17 U	<6.23 U	<5.78 U	0.898 J	2.82 J	<5.56 U	0.37 J	<4.84 U	<4.47 U	<4.47 U	<4.11 U	<5.08 U	<4.3 U	0.861 J
Arsenic	7440-38-2	13	16	16	mg/kg	2.05	6.65	4.89	9.17	9.45	2.95	7.4	2.7	1.2	0.958	3.18	1.16	4.76	11.6
Barium	7440-39-3	350	400	10000	mg/kg	126	20	14.6	15.8	117	13.6	92.2	7.78	6.46	2.32	97.3	3.76	59.4	102
Beryllium	7440-41-7	7.2	590	2700	mg/kg	0.242 J	0.267 J	0.185 J	0.374 J	0.304 J	0.174 J	0.089 J	0.167 J	0.051 J	0.077 J	<0.411 U	<0.508 U	0.073 J	0.073 J
Cadmium	7440-43-9	2.5	9.3	60	mg/kg	<0.834 U	0.187 J	0.258 J	0.196 J	1.26	<1.11 U	0.92 J	<0.969 U	<0.895 U	<0.894 U	<0.823 U	<1.02 U	0.111 J	1.3
Calcium	7440-70-2	NS	NS	NS	mg/kg	5,350	1,520 J	754 J	2,480	51,000	909	33,500	896	232	379	2,320 J	1,430	14,400	45,600
Chromium, Hexavalent	18540-29-9	1	400	800	mg/kg	<0.883 U	<1.3 U	<1.23 U	0.526 J	0.212 J	0.325 J	<0.995 UJ	<0.986 UJ	<0.936 U	<0.946 U	<0.867 UJ	<1.06 UJ	<0.883 UJ	<1.01 UJ
Chromium, Total	7440-47-3	NS	NS	NS	mg/kg	24.8	16.7 J	8.52 J	16.9	37.2	8.2	26.5	10.1	2.91	4.39	23.8	3.88	14.6	35.4
Chromium, Trivalent	16065-83-1	30	1500	6800	mg/kg	24.8	16.7 J	8.52 J	16.4 J	37 J	7.88 J	26.5	10.1	2.91	4.39	23.8	3.88	14.6	35.4
Cobalt	7440-48-4	NS	NS	NS	mg/kg	6.57	5.08	4.1	6.48	4.45	2.01 J	3.99	1.91 J	0.839 J	1.4 J	5.06	0.935 J	6.73	5.4
Copper	7440-50-8	50	270	10000	mg/kg	19.3	12 J	21.2 J	23.2	149	2.77	74.8	3.94	1.52	1.61	20.3	4.85	33	152
Cyanide	57-12-5	27	27	10000	mg/kg	<1.1 UJ	<1.5 UJ	0.44 J	<2.1 UJ	1.7 J	<1.3 UJ	0.73 J	<1.2 U	<1.2 UJ	<1.1 UJ	<1 U	4.3	<1 U	0.58 J
Iron	7439-89-6	NS	NS	NS	mg/kg	22,000	11,000	6,690	15,800	15,400	6,900	14,300	6,610	2,710	3,280	20,400	2,820	14,500	15,600
Lead	7439-92-1	63																	

Table 2
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Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	NYSDEC Part 375 Restricted Use Industrial SCOs	Location	SB08	SB08	SB09	SB09	SB10	SB10	SB10	SB11	SB11	SB12	SB12	SB13
					Sample Name	SB08_0-2	SB08_12-14	SB09_2-4	SB09_12-13.5	SB10_2-4	SODUP01_032723	SB10_12-13.5	SB11_2-4	SB11_12-14	SB12_0-2	SB12_13.5-15	SB13_12-14
					Sample Date	03/28/2023	03/28/2023	03/28/2023	03/28/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/28/2023	03/28/2023	03/31/2023
					Sample Depth	0-2	12-14	2-4	12-13.5	2-4	2-4	12-13.5	2-4	12-14	0-2	13.5-15	12-14
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
Volatile Organic Compounds																	
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
1,1,1-Trichloroethane	71-55-6	0.68	500	1000	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	NS	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
1,1-Dichloroethane	75-34-3	0.27	240	480	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
1,1-Dichloroethene	75-35-4	0.33	500	1000	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
1,1-Dichloropropene	563-58-6	NS	NS	NS	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 UJ	NA	NA	NA	NA	NA	<0.0018 UJ	<0.16 UJ	<0.12 U
1,2,3-Trichloropropane	96-18-4	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 UJ	NA	NA	NA	NA	NA	<0.0018 UJ	0.018 J	0.0024
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
1,2,4-Trimethylbenzene	95-63-6	3.6	190	380	mg/kg	<0.0021 U	NA	NA	0.0013 J	NA	NA	NA	NA	NA	<0.0018 U	0.026 J	0.045 J
1,2-Dibromo-3-Chloropropane	96-12-8	NS	NS	NS	mg/kg	<0.0032 U	NA	NA	<0.0058 UJ	NA	NA	NA	NA	NA	<0.0026 UJ	<0.23 UJ	<0.18 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	NS	NS	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
1,2-Dichlorobenzene	95-50-1	1.1	500	1000	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
1,2-Dichloroethane	107-06-2	0.02	30	60	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
1,2-Dichloropropane	78-87-5	NS	NS	NS	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	190	380	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	0.0051
1,3-Dichlorobenzene	541-73-1	2.4	280	560	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
1,3-Dichloropropane	142-28-9	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
1,4-Dichlorobenzene	106-46-7	1.8	130	250	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
1,4-Diethyl Benzene	105-05-5	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	0.00097 J
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	130	250	mg/kg	<0.084 U	NA	NA	<0.15 U	NA	NA	NA	NA	NA	<0.07 U	<6.3 U	<4.8 U
2,2-Dichloropropane	594-20-7	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
2-Chlorotoluene	95-49-8	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
2-Hexanone (MBK)	591-78-6	NS	NS	NS	mg/kg	<0.01 U	NA	NA	<0.019 U	NA	NA	NA	NA	NA	<0.0088 U	<0.78 U	<0.6 U
4-Chlorotoluene	106-43-4	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
4-Ethyltoluene	622-96-8	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	0.0096 J	NA	NA	NA	NA	NA	<0.0018 U	0.05 J	0.0096
Acetone	67-64-1	0.05	500	1000	mg/kg	0.0083 J	NA	NA	0.12 J	NA	NA	NA	NA	NA	0.0054 J	<0.78 U	0.0096 J
Acrylonitrile	107-13-1	NS	NS	NS	mg/kg	<0.0042 U	NA	NA	<0.0077 U	NA	NA	NA	NA	NA	<0.0035 U	<0.31 U	<0.24 U
Benzene	71-43-2	0.06	44	89	mg/kg	<0.00053 U	NA	NA	0.0026 J	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	0.089
Bromobenzene	108-86-1	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
Bromochloromethane	74-97-5	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
Bromodichloromethane	75-27-4	NS	NS	NS	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
Bromoform	75-25-2	NS	NS	NS	mg/kg	<0.0042 U	NA	NA	<0.0077 U	NA	NA	NA	NA	NA	<0.0035 U	<0.31 U	<0.24 U
Bromomethane	74-83-9	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
Carbon Disulfide	75-15-0	NS	NS	NS	mg/kg	<0.01 U	NA	NA	0.017 J	NA	NA	NA	NA	NA	<0.0088 U	<0.78 U	0.018
Carbon Tetrachloride	56-23-5	0.76	22	44	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
Chlorobenzene	108-90-7	1.1	500	1000	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
Chloroethane	75-00-3	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
Chloroform	67-66-3	0.37	350	700	mg/kg	<0.0016 U	NA	NA	<0.0029 U	NA	NA	NA	NA	NA	<0.0013 U	<0.12 U	<0.09 U
Chloromethane	74-87-3	NS	NS	NS	mg/kg	<0.0042 U	NA	NA	<0.0077 U	NA	NA	NA	NA	NA	<0.0035 U	<0.31 U	<0.24 U
Cis-1,2-Dichloroethene	156-59-2	0.25	500	1000	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
Cis-1,3-Dichloropropene	10061-01-5	NS	NS	NS	mg/kg	<0.00053 U	NA	NA	<0.00096 U	NA	NA	NA	NA	NA	<0.00044 U	<0.039 U	<0.03 U
Cymene	99-87-6	NS	NS	NS	mg/kg	<0.001 U	NA	NA	0.00086 J	NA	NA	NA	NA	NA	<0.00088 U	0.025 J	0.00097 J
Dibromochloromethane	124-48-1	NS	NS	NS	mg/kg	<0.001 U	NA	NA	<0.0019 U	NA	NA	NA	NA	NA	<0.00088 U	<0.078 U	<0.06 U
Dibromomethane	74-95-3	NS	NS	NS	mg/kg	<0.0021 U	NA	NA	<0.0038 U	NA	NA	NA	NA	NA	<0.0018 U	<0.16 U	<0.12 U
Dichlorodifluoromethane	75-71-8	NS	NS	NS	mg/kg	<0.01 U	NA	NA	<0.01								

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Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	NYSDEC Part 375 Restricted Use Industrial SCOs	Location	SB08	SB08	SB09	SB09	SB10	SB10	SB10	SB10	SB11	SB11	SB12	SB12	SB13
					Sample Name	SB08_0-2	SB08_12-14	SB09_2-4	SB09_12-13.5	SB10_2-4	SODUP01_032723	SB10_12-13.5	SB11_2-4	SB11_12-14	SB12_0-2	SB12_13.5-15	SB13_12-14	
					Sample Date	03/28/2023	03/28/2023	03/28/2023	03/28/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/28/2023	03/28/2023	03/31/2023	
					Sample Depth	0-2	12-14	2-4	12-13.5	2-4	2-4	12-13.5	2-4	12-14	0-2	13.5-15	12-14	
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
Semi-Volatile Organic Compounds																		
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
1,2-Dichlorobenzene	95-50-1	1.1	500	1000	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
1,3-Dichlorobenzene	541-73-1	2.4	280	560	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
1,4-Dichlorobenzene	106-46-7	1.8	130	250	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	0.22	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	130	250	mg/kg	<0.027 U	<0.037 U	<0.027 U	<0.033 U	<0.079 U	<0.078 U	<0.031 U	<0.026 U	<0.3 U	<0.027 U	<0.033 U	<0.028 UJ	
2,4,5-Trichlorophenol	95-95-4	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	mg/kg	<0.11 U	<0.15 U	<0.11 U	<0.13 U	<0.32 U	<0.31 U	<0.12 U	<0.11 U	<1.2 U	<0.11 U	<0.13 U	<0.11 U	
2,4-Dichlorophenol	120-83-2	NS	NS	NS	mg/kg	<0.16 U	<0.22 U	<0.16 U	<0.2 U	<0.47 U	<0.47 U	<0.19 U	<0.16 U	<1.8 U	<0.16 U	<0.2 U	<0.17 U	
2,4-Dimethylphenol	105-67-9	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2,4-Dinitrophenol	51-28-5	NS	NS	NS	mg/kg	<0.87 U	<1.2 U	<0.87 U	<1.1 U	<2.5 U	<2.5 U	<0.99 U	<0.85 U	<9.7 U	<0.87 U	<1.1 U	<0.91 U	
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2,6-Dinitrotoluene	606-20-2	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2-Chloronaphthalene	91-58-7	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2-Chlorophenol	95-57-8	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2-Methylnaphthalene	91-57-6	NS	NS	NS	mg/kg	0.12 J	2.4	<0.22 U	0.23 J	<0.63 U	<0.62 U	0.071 J	<0.21 U	140	<0.22 U	<0.26 U	0.037 J	
2-Methylphenol (o-Cresol)	95-48-7	0.33	500	1000	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2-Nitroaniline	88-74-4	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
2-Nitrophenol	88-75-5	NS	NS	NS	mg/kg	<0.39 U	<0.54 U	<0.39 U	<0.48 U	<1.1 U	<1.1 U	<0.45 U	<0.38 U	<4.4 U	<0.39 U	<0.48 U	<0.41 U	
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	500	1000	mg/kg	<0.26 U	<0.36 U	<0.26 U	0.051 J	<0.76 U	<0.75 U	0.04 J	<0.25 U	<2.9 U	<0.26 U	<0.32 U	<0.27 U	
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
3-Nitroaniline	99-09-2	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	NS	mg/kg	<0.47 U	<0.65 U	<0.47 U	<0.58 U	<1.4 U	<1.3 U	<0.54 U	<0.46 U	<5.2 U	<0.47 U	<0.58 U	<0.49 U	
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
4-Chloro-3-Methylphenol	59-50-7	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
4-Chloroaniline	106-47-8	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 UJ	<0.52 UJ	<0.21 UJ	<0.18 UJ	<2 UJ	<0.18 U	<0.22 U	<0.19 U	
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
4-Nitroaniline	100-01-6	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	<0.21 U	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
4-Nitrophenol	100-02-7	NS	NS	NS	mg/kg	<0.25 U	<0.35 U	<0.25 U	<0.31 U	<0.74 U	<0.73 U	<0.29 U	<0.25 U	<2.8 U	<0.25 U	<0.31 U	<0.26 U	
Acenaphthene	83-32-9	20	500	1000	mg/kg	<0.14 U	0.61	<0.14 U	0.12 J	0.095 J	0.16 J	<0.16 U	<0.14 U	56	<0.14 U	0.029 J	0.05 J	
Acenaphthylene	208-96-8	100	500	1000	mg/kg	0.045 J	1.4	<0.14 U	0.13 J	<0.42 U	<0.42 U	<0.16 U	<0.14 U	38	<0.14 U	<0.18 U	<0.15 U	
Acetophenone	98-86-2	NS	NS	NS	mg/kg	<0.18 U	0.2 J	<0.18 U	<0.22 U	<0.53 U	<0.52 U	0.03 J	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
Anthracene	120-12-7	100	500	1000	mg/kg	0.065 J	1.7	0.035 J	0.19	0.26 J	0.4	0.11 J	<0.11 U	120	<0.11 U	<0.13 U	<0.11 U	
Benzo(a)anthracene	56-55-3	1	5.6	11	mg/kg	0.1 J	2.4	0.11	0.13	0.7	1	0.14	0.083 J	120	<0.11 U	0.026 J	<0.11 U	
Benzo(a)pyrene	50-32-8	1	1	1.1	mg/kg	0.093 J	2.2	0.11 J	0.078 J	0.77	1.1	0.11 J	0.087 J	59	<0.14 U	<0.18 U	<0.15 U	
Benzo(b)fluoranthene	205-99-2	1	5.6	11	mg/kg	0.08 J	2.2	0.12	0.087 J	0.8	1.3	0.08 J	0.097 J	45	<0.11 U	<0.13 U	<0.11 U	
Benzo(g,h,i)Perylene	191-24-2	100	500	1000	mg/kg	0.049 J	1.3	0.066 J	0.056 J	0.42	0.64	0.1 J	0.056 J	29	<0.14 U	<0.18 U	<0.15 U	
Benzo(k)fluoranthene	207-08-9	0.8	56	110	mg/kg	<0.11 U	0.66	0.042 J	<0.13 U	0.39	0.41	<0.12 U	0.042 J	9.3	<0.11 U	<0.13 U	<0.11 U	
Benzoic Acid	65-85-0	NS	NS	NS	mg/kg	<0.59 U	<0.8 U	<0.59 U	<0.72 U	<1.7 U	<1.7 U	<0.67 U	<0.57 U	<6.5 U	<0.59 U	<0.72 U	<0.62 U	
Benzyl Alcohol	100-51-6	NS	NS	NS	mg/kg	<0.18 U	<0.25 U	<0.18 U	<0.22 U	<0.53 U	<0.52 U	0.2 J	<0.18 U	<2 U	<0.18 U	<0.22 U	<0.19 U	
Benzyl Butyl Phthalate	85-68-7	NS	NS	NS	mg/kg	<0.18 U	4.1	<0.18 U	0.75	<0.53 U	<0.52 U	96	<0.18 U	0.52 J	<0.18 U	<0.22 U	<0.19 U	
Biphenyl (Diphenyl)	92-52-4	NS	NS	NS	mg/kg	<0.42 U	0.35 J	<0.41 U	0.073 J	<1.2 U	<1.2 U							

Table 2
Phase II Environmental Site Investigation Report
Soil Sample Analytical Results

2731 West 12th Street
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Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	NYSDEC Part 375 Restricted Use Industrial SCOs	Location	SB08	SB08	SB09	SB09	SB10	SB10	SB11	SB11	SB12	SB12	SB13	
					Sample Name	SB08_0-2	SB08_12-14	SB09_2-4	SB09_12-13.5	SB10_2-4	SODUP01_032723	SB10_12-13.5	SB11_2-4	SB11_12-14	SB12_0-2	SB12_13.5-15	SB13_12-14
					Sample Date	03/28/2023	03/28/2023	03/28/2023	03/28/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/28/2023	03/28/2023	03/28/2023
					Sample Depth	0-2	12-14	2-4	12-13.5	2-4	2-4	12-13.5	2-4	12-14	0-2	13.5-15	12-14
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
Pesticides																	
4,4'-DDD	72-54-8	0.0033	92	180	mg/kg	<0.00174 UJ	NA	0.00542 J	NA	0.0124	0.0136 J	NA	0.00172 J	NA	<0.00173 UJ	NA	NA
4,4'-DDE	72-55-9	0.0033	62	120	mg/kg	0.00139 J	NA	<0.0017 UJ	NA	0.014	0.0153 J	NA	0.00134 J	NA	0.000824 J	NA	NA
4,4'-DDT	50-29-3	0.0033	47	94	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	0.0187 J	0.0187 J	NA	0.00268 J	NA	<0.00173 UJ	NA	NA
Aldrin	309-00-2	0.005	0.68	1.4	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	<0.00171 U	<0.0017 U	NA	<0.00173 U	NA	<0.00173 UJ	NA	NA
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.02	3.4	6.8	mg/kg	<0.000725 UJ	NA	<0.000708 UJ	NA	<0.000713 U	<0.000708 U	NA	<0.00072 U	NA	<0.00072 UJ	NA	NA
Alpha Chlordane	5103-71-9	0.094	24	47	mg/kg	<0.00217 UJ	NA	<0.00212 UJ	NA	0.00822 J	0.0093 J	NA	<0.00216 U	NA	<0.00216 UJ	NA	NA
Alpha Endosulfan	959-98-8	2.4	200	920	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	<0.00171 U	<0.0017 U	NA	<0.00173 U	NA	<0.00173 UJ	NA	NA
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	3	14	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	<0.00171 U	<0.0017 U	NA	<0.00173 U	NA	<0.00173 UJ	NA	NA
Beta Endosulfan	33213-65-9	2.4	200	920	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	<0.00171 U	<0.0017 U	NA	<0.00173 U	NA	<0.00173 UJ	NA	NA
Chlordane (alpha and gamma)	57-74-9	NS	NS	NS	mg/kg	<0.0145 UJ	NA	<0.0142 UJ	NA	0.0574 J	<0.0142 UJ	NA	<0.0144 U	NA	<0.0144 UJ	NA	NA
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	500	1000	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	<0.00171 U	<0.0017 U	NA	<0.00173 U	NA	<0.00173 UJ	NA	NA
Dieldrin	60-57-1	0.005	1.4	2.8	mg/kg	<0.00109 UJ	NA	<0.00106 UJ	NA	<0.00107 U	<0.00106 U	NA	<0.00108 U	NA	<0.00108 UJ	NA	NA
Endosulfan Sulfate	1031-07-8	2.4	200	920	mg/kg	<0.000725 UJ	NA	<0.000708 UJ	NA	<0.000713 U	0.000554 J	NA	<0.00072 U	NA	<0.00072 UJ	NA	NA
Endrin	72-20-8	0.014	89	410	mg/kg	<0.000725 UJ	NA	<0.000708 UJ	NA	<0.000713 U	<0.000708 U	NA	<0.00072 U	NA	<0.00072 UJ	NA	NA
Endrin Aldehyde	7421-93-4	NS	NS	NS	mg/kg	<0.00217 UJ	NA	<0.00212 UJ	NA	<0.00214 U	<0.00212 U	NA	<0.00216 U	NA	<0.00216 UJ	NA	NA
Endrin Ketone	53494-70-5	NS	NS	NS	mg/kg	<0.00174 UJ	NA	<0.0017 UJ	NA	<0.00171 U	<0.0017 U	NA	<0.00173 U	NA	<0.00173 UJ	NA	NA
Gamma Bhc (Lindane)	58-89-9	0.1	9.2	23	mg/kg	<0.000725 UJ	NA	<0.000708 UJ	NA	<0.000713 U	<0.000708 U	NA	<0.00072 U	NA	<0.00072 UJ	NA	NA
Gamma Chlordane (Trans)	5103-74-2	NS	NS	NS	mg/kg	<0.00217 UJ	NA	<0.00212 UJ	NA	0.011	0.0073 J	NA	<0.00216 U	NA	<0.00216 UJ	NA	NA
Heptachlor	76-44-8	0.042	15	29	mg/kg	<0.00087 UJ	NA	<0.000849 UJ	NA	<0.000856 U	<0.000849 U	NA	<0.000864 U	NA	<0.000864 UJ	NA	NA
Heptachlor Epoxide	1024-57-3	NS	NS	NS	mg/kg	<0.00326 UJ	NA	<0.00318 UJ	NA	0.00243 J	<0.00318 U	NA	<0.00324 U	NA	<0.00324 UJ	NA	NA
Methoxychlor	72-43-5	NS	NS	NS	mg/kg	<0.00326 UJ	NA	<0.00318 UJ	NA	<0.00321 U	<0.00318 U	NA	<0.00324 U	NA	<0.00324 UJ	NA	NA
Toxaphene	8001-35-2	NS	NS	NS	mg/kg	<0.0326 UJ	NA	<0.0318 UJ	NA	<0.0321 U	<0.0318 U	NA	<0.0324 U	NA	<0.0324 UJ	NA	NA
Herbicides																	
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	NS	NS	NS	mg/kg	<0.18 U	NA	<0.182 U	NA	<0.183 U	<0.181 U	NA	<0.181 U	NA	<0.181 U	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	NS	NS	NS	mg/kg	<0.18 U	NA	<0.182 U	NA	<0.183 U	<0.181 U	NA	<0.181 U	NA	<0.181 U	NA	NA
Silvex (2,4,5-Tp)	93-72-1	3.8	500	1000	mg/kg	<0.18 U	NA	<0.182 U	NA	<0.183 U	<0.181 U	NA	<0.181 U	NA	<0.181 U	NA	NA
Polychlorinated Biphenyl																	
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	0.1	1	25	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																	
Aluminum	7429-90-5	NS	NS	NS	mg/kg	12,100	1,550	8,010	503	6,430	6,440	4,340	5,590	1,260	16,100	4,150	NA
Antimony	7440-36-0	NS	NS	NS	mg/kg	1.3 J	0.994 J	1.38 J	2.9 J	0.903 J	1.02 J	0.979 J	0.862 J	1.69 J	2.46 J	0.413 J	NA
Arsenic	7440-38-2	13	16	16	mg/kg	3.29	8.3	7.54	4.21	4.54	4.63	3.28	4.64	9.75	1.1	6.3	NA
Barium	7440-39-3	350	400	10000	mg/kg	118	81.4	85.9	41.9	111	121	75.8	118	41.8	158	9.45	NA
Beryllium	7440-41-7	7.2	590	2700	mg/kg	0.457	0.252 J	0.489	0.139 J	0.612	0.61	0.356 J	0.524	0.278 J	0.616	0.284 J	NA
Cadmium	7440-43-9	2.5	9.3	60	mg/kg	<0.858 U	<1.19 U	<0.842 U	0.395 J	0.555 J	0.585 J	1.09	0.332 J	0.437 J	<0.856 U	<1.02 U	NA
Calcium	7440-70-2	NS	NS	NS	mg/kg	1,770	2,050	4,730	1,610	11,400	12,500	36,600	9,550	2,600	1,940	1,050	NA
Chromium, Hexavalent	18540-29-9	1	400	800	mg/kg	<0.886 UJ	<1.21 U	<0.878 U	<1.07 U	<0.897 U	<0.89 UJ	<1 UJ	<0.873 UJ	<0.982 UJ	<0.89 UJ	<1.07 UJ	NA
Chromium, Total	7440-47-3	NS	NS	NS	mg/kg	21.7	13.2	35.7	16.7	15.7	17.6	11.6	12.4	27.8	32.6	10.8	NA
Chromium, Trivalent	16065-83-1	30	1500	6800	mg/kg	21.7	12.6 J	34.8	16 J	15.1 J	17.6	11.6	12.4	27.8	32.6	10.8	NA
Cobalt	7440-48-4	NS	NS	NS	mg/kg	9.69	3.15	8.95	5.36	8.42	8.66	6.13	7.27	9.63	12.8	3.2	NA
Copper	7440-50-8	50	270	10000	mg/kg	36.5	43	41.2	59.2	32.2	31.4	20.7	19.2	79.3	43.5	3.89	NA
Cyanide	57-12-5	27	27	10000	mg/kg	<1.1 U	4.9	<1 U	0.32 J	<1 U	<1.1 U	<1.2 U	<1.1 U	2.7	<1 U	<1.3 U	NA
Iron	7439-89-6	NS	NS	NS	mg/kg	20,300	8,420	16,100	12,000	12,700	12,400	11,600	12,400	21,700	25,600	12,200	NA
Lead	7439-92-1	63	1000	3900	mg/kg	4.47	54.7	22.1	82.4	113	111	33	40.7	61	2.96 J	4.46 J	NA
Magnesium	7439-95-4	NS	NS	NS	mg/kg	6,960	601	4,780	340	3,590	3,370	13,900	2,200	404	10,000	1,640	NA
Manganese	7439-96-5	1600	10000	10000	mg/kg	179	38.5	194	44.8	232	252	210	312	30.5	2		

Table 2
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Notes:

CAS - Chemical Abstract Service

NS - No standard

mg/kg - milligram per kilogram

NA - Not analyzed

RL - Reporting limit

<RL - Not detected

Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use, Restricted Use Commercial, and Restricted Use Industrial Soil Cleanup Objectives (SCO).

Criterion comparisons for 3- & 4-methylphenol (m&p cresol) are provided for reference. Promulgated SCOs are for 3-methylphenol (m-cresol) and 4-methylphenol (p-cresol).

Qualifiers:

J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.

U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Exceedance Summary:

- 10** - Result exceeds Unrestricted Use SCOs
- 10** - Result exceeds Restricted Use Commercial SCOs
- 10 - Result exceeds Restricted Use Industrial SCOs

Analyte	CAS Number	NYSDOH Decision Matrices Minimum Concentrations	Location	AA01	SV01	SV02	SV03	SV04
			Sample Name	AA01_033023	SV01_033023	SV02_033023	SV03_033023	SV04_033023
			Sample Date	03/30/2023	03/30/2023	03/30/2023	03/30/2023	03/30/2023
			Sample Type	AA	SV	SV	SV	SV
			Unit	Result	Result	Result	Result	Result
Volatile Organic Compounds								
1,1,1-Trichloroethane	71-55-6	100	ug/m3	<1.09 U	3.42	<5.46 U	<1.09 U	<1.09 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	ug/m3	<1.37 U	<1.37 U	<6.87 U	<1.37 U	<1.37 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	ug/m3	<1.53 U	<1.53 U	<7.66 U	<1.53 U	1.7
1,1,2-Trichloroethane	79-00-5	NS	ug/m3	<1.09 U	<1.09 U	<5.46 U	<1.09 U	<1.09 U
1,1-Dichloroethane	75-34-3	NS	ug/m3	<0.809 U	<0.809 U	<4.05 U	<0.809 U	<0.809 U
1,1-Dichloroethene	75-35-4	6	ug/m3	<0.793 U	<0.793 U	<3.96 U	<0.793 U	<0.793 U
1,2,4-Trichlorobenzene	120-82-1	NS	ug/m3	<1.48 U	<1.48 U	<7.42 U	<1.48 U	<1.48 U
1,2,4-Trimethylbenzene	95-63-6	NS	ug/m3	<0.983 U	22.6	13	8.6	51.6
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	ug/m3	<1.54 U	<1.54 U	<7.69 U	<1.54 U	<1.54 U
1,2-Dichlorobenzene	95-50-1	NS	ug/m3	<1.20 U	<1.20 U	<6.01 U	<1.20 U	<1.20 U
1,2-Dichloroethane	107-06-2	NS	ug/m3	<0.809 U	<0.809 U	<4.05 U	<0.809 U	<0.809 U
1,2-Dichloropropane	78-87-5	NS	ug/m3	<0.924 U	<0.924 U	<4.62 U	<0.924 U	<0.924 U
1,2-Dichlorotetrafluoroethane	76-14-2	NS	ug/m3	<1.40 U	<1.40 U	<6.99 U	<1.40 U	<1.40 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	NS	ug/m3	<0.983 U	7.72	<4.92 U	2.06	29.9
1,3-Butadiene	106-99-0	NS	ug/m3	<0.442 U	<0.442 U	2.7	<0.442 U	0.874
1,3-Dichlorobenzene	541-73-1	NS	ug/m3	<1.20 U	<1.20 U	<6.01 U	<1.20 U	<1.20 U
1,4-Dichlorobenzene	106-46-7	NS	ug/m3	<1.20 U	<1.20 U	<6.01 U	<1.20 U	<1.20 U
1,4-Dioxane (P-Dioxane)	123-91-1	NS	ug/m3	<0.721 U	<0.721 U	<3.60 U	<0.721 U	<0.721 U
2,2,4-Trimethylpentane	540-84-1	NS	ug/m3	<0.934 U	2.51	269	<0.934 U	16
2-Hexanone (MBK)	591-78-6	NS	ug/m3	<0.820 U	28.4	<4.10 U	<0.820 U	<0.820 U
4-Ethyltoluene	622-96-8	NS	ug/m3	<0.983 U	14.5	35.1	1.94	26.8
Acetone	67-64-1	NS	ug/m3	2.85	187	314	52.5	125
Allyl Chloride (3-Chloropropene)	107-05-1	NS	ug/m3	<0.626 U	<0.626 U	<3.13 U	<0.626 U	<0.626 U
Benzene	71-43-2	NS	ug/m3	<0.639 U	69.6	39.9	3.16	130
Benzyl Chloride	100-44-7	NS	ug/m3	<1.04 U	<1.04 U	<5.18 U	<1.04 U	<1.04 U
Bromodichloromethane	75-27-4	NS	ug/m3	<1.34 U	<1.34 U	<6.70 U	<1.34 U	<1.34 U
Bromoethene	593-60-2	NS	ug/m3	<0.874 U	<0.874 U	<4.37 U	<0.874 U	<0.874 U
Bromoform	75-25-2	NS	ug/m3	<2.07 U	<2.07 U	<10.3 U	<2.07 U	<2.07 U
Bromomethane	74-83-9	NS	ug/m3	<0.777 U	<0.777 U	<3.88 U	<0.777 U	<0.777 U
Carbon Disulfide	75-15-0	NS	ug/m3	<0.623 U	64.5	66.6	6.07	159
Carbon Tetrachloride	56-23-5	6	ug/m3	<1.26 U	<1.26 U	<6.29 U	<1.26 U	<1.26 U
Chlorobenzene	108-90-7	NS	ug/m3	<0.921 U	<0.921 U	<4.61 U	<0.921 U	<0.921 U
Chloroethane	75-00-3	NS	ug/m3	<0.528 U	<0.528 U	<2.64 U	<0.528 U	<0.528 U
Chloroform	67-66-3	NS	ug/m3	<0.977 U	1.16	<4.88 U	<0.977 U	<0.977 U
Chloromethane	74-87-3	NS	ug/m3	1.03	<0.413 U	<2.07 U	<0.413 U	<0.413 U
Cis-1,2-Dichloroethene	156-59-2	6	ug/m3	<0.793 U	<0.793 U	<3.96 U	<0.793 U	<0.793 U
Cis-1,3-Dichloropropene	10061-01-5	NS	ug/m3	<0.908 U	<0.908 U	<4.54 U	<0.908 U	<0.908 U
Cyclohexane	110-82-7	NS	ug/m3	<0.688 U	2.08	805	<0.688 U	16.1
Dibromochloromethane	124-48-1	NS	ug/m3	<1.70 U	<1.70 U	<8.52 U	<1.70 U	<1.70 U
Dichlorodifluoromethane	75-71-8	NS	ug/m3	2.42	2.82	<4.94 U	3.48	2.8
Ethanol	64-17-5	NS	ug/m3	<9.42 U	16.8	<47.1 U	20.2	<9.42 U
Ethyl Acetate	141-78-6	NS	ug/m3	<1.80 U	<1.80 U	<9.01 U	<1.80 U	<1.80 U
Ethylbenzene	100-41-4	NS	ug/m3	<0.869 U	86.4	44.3	6.65	129
Hexachlorobutadiene	87-68-3	NS	ug/m3	<2.13 U	<2.13 U	<10.7 U	<2.13 U	<2.13 U
Isopropanol	67-63-0	NS	ug/m3	<1.23 U	2.93	<6.15 U	6.78	3.37
M,P-Xylene	179601-23-1	NS	ug/m3	<1.74 U	46	29.4	5.08	77.7
Methyl Ethyl Ketone (2-Butanone)	78-93-3	NS	ug/m3	<1.47 U	354	11.5	6.11	16.8
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	ug/m3	<2.05 U	2.33	<10.2 U	<2.05 U	<2.05 U
Methylene Chloride	75-09-2	100	ug/m3	<1.74 U	<1.74 U	<8.69 U	<1.74 U	<1.74 U
n-Heptane	142-82-5	NS	ug/m3	<0.820 U	7.01	138	<0.820 U	17.9
n-Hexane	110-54-3	NS	ug/m3	<0.705 U	3.7	472	<0.705 U	20.4
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	ug/m3	<0.869 U	34.2	17.9	3.87	53.4
Styrene	100-42-5	NS	ug/m3	<0.852 U	10.7	6.13	<0.852 U	31
Tert-Butyl Alcohol	75-65-0	NS	ug/m3	<1.52 U	<1.52 U	<7.58 U	1.53	<1.52 U
Tert-Butyl Methyl Ether	1634-04-4	NS	ug/m3	<0.721 U	<0.721 U	<3.61 U	<0.721 U	<0.721 U
Tetrachloroethene (PCE)	127-18-4	100	ug/m3	<1.36 U	1.74	<6.78 U	<1.36 U	2.54
Tetrahydrofuran	109-99-9	NS	ug/m3	<1.47 U	<1.47 U	<7.37 U	<1.47 U	<1.47 U
Toluene	108-88-3	NS	ug/m3	<0.754 U	49.7	18.3	1.34	64.8
Total Xylenes	1330-20-7	NS	ug/m3	<0.869 U	80.4	47.3	8.95	131
Trans-1,2-Dichloroethene	156-60-5	NS	ug/m3	<0.793 U	<0.793 U	<3.96 U	<0.793 U	<0.793 U
Trans-1,3-Dichloropropene	10061-02-6	NS	ug/m3	<0.908 U	<0.908 U	<4.54 U	<0.908 U	<0.908 U
Trichloroethene (TCE)	79-01-6	6	ug/m3	<1.07 U	<1.07 U	<5.37 U	<1.07 U	<1.07 U
Trichlorofluoromethane	75-69-4	NS	ug/m3	1.34	1.6	<5.62 U	2.56	1.69
Vinyl Chloride	75-01-4	6	ug/m3	<0.511 U	<0.511 U	<2.56 U	<0.511 U	<0.511 U
Total BTEX	BTEX	NS	ug/m3	ND	286.1	149.8	20.1	454.8
Total VOCs	VOCs	NS	ug/m3	7.64	1,023.42	2,282.83	131.93	978.37

Notes:
AA - Ambient Air
SV - Soil Vapor
CAS - Chemical Abstract Service
NS - No standard
ug/m3 - microgram per cubic meter
RL - Reporting limit
<RL - Not detected
ND - Not detected
Soil vapor sample analytical results are compared to the minimum soil vapor concentrations at which mitigation is recommended as set forth in the New York State Department
Ambient air sample analytical results are shown for reference only.

Qualifiers:
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank

Exceedance Summary:

10

 - Result exceeds minimum soil vapor concentrations recommending mitigation

Table 4

Phase II Environmental Site Investigation Report

Quality Assurance/Quality Control Sample Analytical Results

2731 West 12th Street
Brooklyn, New York

Analyte	CAS Number	Sample Type	FB	TB	FB	TB
		Sample Name	SOFB01_032823	TB01_032823	SOFB02_033123	TB02_033123
		Sample Date	03/28/2023	03/28/2023	03/31/2023	03/31/2023
		Unit	Result	Result	Result	Result
Volatile Organic Compounds						
1,1,1,2-Tetrachloroethane	630-20-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,1,1-Trichloroethane	71-55-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,1,2,2-Tetrachloroethane	79-34-5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2-Trichloroethane	79-00-5	ug/l	<1.5 U	<1.5 U	<1.5 U	<1.5 U
1,1-Dichloroethane	75-34-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,1-Dichloroethene	75-35-4	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-Dichloropropene	563-58-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2,3-Trichlorobenzene	87-61-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2,3-Trichloropropane	96-18-4	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2,4,5-Tetramethylbenzene	95-93-2	ug/l	<2 U	<2 U	<2 U	<2 U
1,2,4-Trichlorobenzene	120-82-1	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2,4-Trimethylbenzene	95-63-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2-Dibromo-3-Chloropropane	96-12-8	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	ug/l	<2 U	<2 U	<2 U	<2 U
1,2-Dichlorobenzene	95-50-1	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,2-Dichloroethane	107-06-2	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-Dichloropropane	78-87-5	ug/l	<1 U	<1 U	<1 U	<1 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,3-Dichlorobenzene	541-73-1	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,3-Dichloropropane	142-28-9	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,4-Dichlorobenzene	106-46-7	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
1,4-Diethyl Benzene	105-05-5	ug/l	<2 U	<2 U	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	123-91-1	ug/l	<250 U	<250 U	<250 U	<250 U
2,2-Dichloropropane	594-20-7	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
2-Chlorotoluene	95-49-8	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
2-Hexanone (MBK)	591-78-6	ug/l	<5 U	<5 U	<5 U	<5 U
4-Chlorotoluene	106-43-4	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
4-Ethyltoluene	622-96-8	ug/l	<2 U	<2 U	<2 U	<2 U
Acetone	67-64-1	ug/l	<5 U	<5 U	<5 U	<5 U
Acrylonitrile	107-13-1	ug/l	<5 U	<5 U	<5 U	<5 U
Benzene	71-43-2	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Bromobenzene	108-86-1	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Bromochloromethane	74-97-5	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Bromodichloromethane	75-27-4	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Bromoform	75-25-2	ug/l	<2 U	<2 U	<2 U	<2 U
Bromomethane	74-83-9	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Carbon Disulfide	75-15-0	ug/l	<5 U	<5 U	<5 U	<5 U
Carbon Tetrachloride	56-23-5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chlorobenzene	108-90-7	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Chloroethane	75-00-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Chloroform	67-66-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Chloromethane	74-87-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Cis-1,2-Dichloroethene	156-59-2	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Cis-1,3-Dichloropropene	10061-01-5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Cymene	99-87-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Dibromochloromethane	124-48-1	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Dibromomethane	74-95-3	ug/l	<5 U	<5 U	<5 U	<5 U
Dichlorodifluoromethane	75-71-8	ug/l	<5 U	<5 U	<5 U	<5 U
Diethyl Ether (Ethyl Ether)	60-29-7	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Ethylbenzene	100-41-4	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Hexachlorobutadiene	87-68-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Isopropylbenzene (Cumene)	98-82-8	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
M,P-Xylene	179601-23-1	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	ug/l	<5 U	<5 U	<5 U	<5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	ug/l	<5 U	<5 U	<5 U	<5 U
Methylene Chloride	75-09-2	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Naphthalene	91-20-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
n-Butylbenzene	104-51-8	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
n-Propylbenzene	103-65-1	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Sec-Butylbenzene	135-98-8	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Styrene	100-42-5	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
T-Butylbenzene	98-06-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Tert-Butyl Methyl Ether	1634-04-4	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Tetrachloroethene (PCE)	127-18-4	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Toluene	108-88-3	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Total Xylenes	1330-20-7	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Trans-1,2-Dichloroethene	156-60-5	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Trans-1,3-Dichloropropene	10061-02-6	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Trans-1,4-Dichloro-2-Butene	110-57-6	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Trichloroethene (TCE)	79-01-6	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Trichlorofluoromethane	75-69-4	ug/l	<2.5 U	<2.5 U	<2.5 U	<2.5 U
Vinyl Acetate	108-05-4	ug/l	<5 U	<5 U	<5 U	<5 U
Vinyl Chloride	75-01-4	ug/l	<1 U	<1 U	<1 U	<1 U

2731 West 12th Street

Brooklyn, New York

Analyte	CAS Number	Sample Type	FB	TB	FB	TB
		Sample Name	SOFB01_032823	TB01_032823	SOFB02_033123	TB02_033123
		Sample Date	03/28/2023	03/28/2023	03/31/2023	03/31/2023
		Unit	Result	Result	Result	Result
Semi-Volatile Organic Compounds						
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/l	<10 U	NA	<10 U	NA
1,2,4-Trichlorobenzene	120-82-1	ug/l	<5 U	NA	<5 U	NA
1,2-Dichlorobenzene	95-50-1	ug/l	<2 U	NA	<2 U	NA
1,3-Dichlorobenzene	541-73-1	ug/l	<2 U	NA	<2 U	NA
1,4-Dichlorobenzene	106-46-7	ug/l	<2 U	NA	<2 U	NA
2,4,5-Trichlorophenol	95-95-4	ug/l	<5 U	NA	<5 U	NA
2,4,6-Trichlorophenol	88-06-2	ug/l	<5 U	NA	<5 U	NA
2,4-Dichlorophenol	120-83-2	ug/l	<5 U	NA	<5 U	NA
2,4-Dimethylphenol	105-67-9	ug/l	<5 U	NA	<5 U	NA
2,4-Dinitrophenol	51-28-5	ug/l	<20 U	NA	<20 U	NA
2,4-Dinitrotoluene	121-14-2	ug/l	<5 U	NA	<5 U	NA
2,6-Dinitrotoluene	606-20-2	ug/l	<5 U	NA	<5 U	NA
2-Chloronaphthalene	91-58-7	ug/l	<0.2 U	NA	<0.2 U	NA
2-Chlorophenol	95-57-8	ug/l	<2 U	NA	<2 U	NA
2-Methylnaphthalene	91-57-6	ug/l	<0.1 U	NA	<0.1 U	NA
2-Methylphenol (o-Cresol)	95-48-7	ug/l	<5 U	NA	<5 U	NA
2-Nitroaniline	88-74-4	ug/l	<5 U	NA	<5 U	NA
2-Nitrophenol	88-75-5	ug/l	<10 U	NA	<10 U	NA
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	ug/l	<5 U	NA	<5 U	NA
3,3'-Dichlorobenzidine	91-94-1	ug/l	<5 U	NA	<5 U	NA
3-Nitroaniline	99-09-2	ug/l	<5 U	NA	<5 U	NA
4,6-Dinitro-2-Methylphenol	534-52-1	ug/l	<10 U	NA	<10 U	NA
4-Bromophenyl Phenyl Ether	101-55-3	ug/l	<2 U	NA	<2 U	NA
4-Chloro-3-Methylphenol	59-50-7	ug/l	<2 U	NA	<2 U	NA
4-Chloroaniline	106-47-8	ug/l	<5 U	NA	<5 U	NA
4-Chlorophenyl Phenyl Ether	7005-72-3	ug/l	<2 U	NA	<2 U	NA
4-Nitroaniline	100-01-6	ug/l	<5 U	NA	<5 U	NA
4-Nitrophenol	100-02-7	ug/l	<10 U	NA	<10 U	NA
Acenaphthene	83-32-9	ug/l	<0.1 U	NA	<0.1 U	NA
Acenaphthylene	208-96-8	ug/l	<0.1 U	NA	<0.1 U	NA
Acetophenone	98-86-2	ug/l	<5 U	NA	<5 U	NA
Anthracene	120-12-7	ug/l	<0.1 U	NA	<0.1 U	NA
Benzo(a)anthracene	56-55-3	ug/l	<0.1 U	NA	<0.1 U	NA
Benzo(a)pyrene	50-32-8	ug/l	<0.1 U	NA	<0.1 U	NA
Benzo(b)fluoranthene	205-99-2	ug/l	<0.1 U	NA	<0.1 U	NA
Benzo(g,h,i)Perylene	191-24-2	ug/l	<0.1 U	NA	<0.1 U	NA
Benzo(k)fluoranthene	207-08-9	ug/l	<0.1 U	NA	<0.1 U	NA
Benzoic Acid	65-85-0	ug/l	<50 U	NA	<50 U	NA
Benzyl Alcohol	100-51-6	ug/l	<2 U	NA	<2 U	NA
Benzyl Butyl Phthalate	85-68-7	ug/l	<5 U	NA	<5 U	NA
Biphenyl (Diphenyl)	92-52-4	ug/l	<2 U	NA	<2 U	NA
Bis(2-chloroethoxy) methane	111-91-1	ug/l	<5 U	NA	<5 U	NA
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	ug/l	<2 U	NA	<2 U	NA
Bis(2-chloroisopropyl) ether	108-60-1	ug/l	<2 U	NA	<2 U	NA
Bis(2-ethylhexyl) phthalate	117-81-7	ug/l	<3 U	NA	<3 U	NA
Carbazole	86-74-8	ug/l	<2 U	NA	<2 U	NA
Chrysene	218-01-9	ug/l	<0.1 U	NA	<0.1 U	NA
Dibenz(a,h)anthracene	53-70-3	ug/l	<0.1 U	NA	<0.1 U	NA
Dibenzofuran	132-64-9	ug/l	<2 U	NA	<2 U	NA
Dibutyl phthalate	84-74-2	ug/l	<5 U	NA	<5 U	NA
Diethyl phthalate	84-66-2	ug/l	<5 U	NA	<5 U	NA
Dimethyl phthalate	131-11-3	ug/l	<5 U	NA	<5 U	NA
Dioctyl phthalate	117-84-0	ug/l	<5 U	NA	<5 U	NA
Fluoranthene	206-44-0	ug/l	<0.1 U	NA	<0.1 U	NA
Fluorene	86-73-7	ug/l	<0.1 U	NA	<0.1 U	NA
Hexachlorobenzene	118-74-1	ug/l	<0.8 U	NA	<0.8 U	NA
Hexachlorobutadiene	87-68-3	ug/l	<0.5 U	NA	<0.5 U	NA
Hexachlorocyclopentadiene	77-47-4	ug/l	<20 U	NA	<20 U	NA
Hexachloroethane	67-72-1	ug/l	<0.8 U	NA	<0.8 U	NA
Indeno(1,2,3-cd)pyrene	193-39-5	ug/l	<0.1 U	NA	<0.1 U	NA
Isophorone	78-59-1	ug/l	<5 U	NA	<5 U	NA
Naphthalene	91-20-3	ug/l	<0.1 U	NA	0.05 J	NA
Nitrobenzene	98-95-3	ug/l	<2 U	NA	<2 U	NA
n-Nitrosodi-N-Propylamine	621-64-7	ug/l	<5 U	NA	<5 U	NA
n-Nitrosodiphenylamine	86-30-6	ug/l	<2 U	NA	<2 U	NA
Pentachlorophenol	87-86-5	ug/l	<0.8 U	NA	0.06 J	NA
Phenanthrene	85-01-8	ug/l	<0.1 U	NA	<0.1 U	NA
Phenol	108-95-2	ug/l	<5 U	NA	<5 U	NA
Pyrene	129-00-0	ug/l	<0.1 U	NA	<0.1 U	NA

Table 4

Phase II Environmental Site Investigation Report

Quality Assurance/Quality Control Sample Analytical Results

2731 West 12th Street
Brooklyn, New York

Analyte	CAS Number	Sample Type	FB	TB	FB	TB
		Sample Name	SOFB01_032823	TB01_032823	SOFB02_033123	TB02_033123
		Sample Date	03/28/2023	03/28/2023	03/31/2023	03/31/2023
		Unit	Result	Result	Result	Result
Pesticides						
4,4'-DDD	72-54-8	ug/l	<0.029 U	NA	<0.029 U	NA
4,4'-DDE	72-55-9	ug/l	<0.029 U	NA	<0.029 U	NA
4,4'-DDT	50-29-3	ug/l	<0.029 U	NA	0.013 J	NA
Aldrin	309-00-2	ug/l	<0.014 U	NA	<0.014 U	NA
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	ug/l	<0.014 U	NA	<0.014 U	NA
Alpha Chlordane	5103-71-9	ug/l	<0.014 U	NA	<0.014 U	NA
Alpha Endosulfan	959-98-8	ug/l	<0.014 U	NA	<0.014 U	NA
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	ug/l	<0.014 U	NA	<0.014 U	NA
Beta Endosulfan	33213-65-9	ug/l	<0.029 U	NA	<0.029 U	NA
Chlordane (alpha and gamma)	57-74-9	ug/l	<0.143 U	NA	<0.143 U	NA
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	ug/l	<0.014 U	NA	<0.014 U	NA
Dieldrin	60-57-1	ug/l	<0.029 U	NA	<0.029 U	NA
Endosulfan Sulfate	1031-07-8	ug/l	<0.029 U	NA	<0.029 U	NA
Endrin	72-20-8	ug/l	<0.029 U	NA	<0.029 U	NA
Endrin Aldehyde	7421-93-4	ug/l	<0.029 U	NA	<0.029 U	NA
Endrin Ketone	53494-70-5	ug/l	<0.029 U	NA	<0.029 U	NA
Gamma Bhc (Lindane)	58-89-9	ug/l	<0.014 U	NA	<0.014 U	NA
Gamma Chlordane (Trans)	5103-74-2	ug/l	<0.014 U	NA	<0.014 U	NA
Heptachlor	76-44-8	ug/l	<0.014 U	NA	<0.014 U	NA
Heptachlor Epoxide	1024-57-3	ug/l	<0.014 U	NA	<0.014 U	NA
Methoxychlor	72-43-5	ug/l	<0.143 U	NA	<0.143 U	NA
Toxaphene	8001-35-2	ug/l	<0.143 U	NA	<0.143 U	NA
Herbicides						
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	ug/l	<2 U	NA	<2 U	NA
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	ug/l	<10 U	NA	<10 U	NA
Silvex (2,4,5-Tp)	93-72-1	ug/l	<2 U	NA	<2 U	NA
Polychlorinated Biphenyl						
PCB-1016 (Aroclor 1016)	12674-11-2	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1221 (Aroclor 1221)	11104-28-2	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1232 (Aroclor 1232)	11141-16-5	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1242 (Aroclor 1242)	53469-21-9	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1248 (Aroclor 1248)	12672-29-6	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1254 (Aroclor 1254)	11097-69-1	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1260 (Aroclor 1260)	11096-82-5	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1262 (Aroclor 1262)	37324-23-5	ug/l	<0.071 U	NA	<0.071 U	NA
PCB-1268 (Aroclor 1268)	11100-14-4	ug/l	<0.071 U	NA	<0.071 U	NA
Total PCBs	1336-36-3	ug/l	<0.071 U	NA	<0.071 U	NA
Metals						
Aluminum	7429-90-5	ug/l	<10 U	NA	<10 U	NA
Antimony	7440-36-0	ug/l	<4 U	NA	<4 U	NA
Arsenic	7440-38-2	ug/l	<0.5 U	NA	<0.5 U	NA
Barium	7440-39-3	ug/l	<0.5 U	NA	<0.5 U	NA
Beryllium	7440-41-7	ug/l	<0.5 U	NA	<0.5 U	NA
Cadmium	7440-43-9	ug/l	<0.2 U	NA	<0.2 U	NA
Calcium	7440-70-2	ug/l	<100 U	NA	<100 U	NA
Chromium, Hexavalent	18540-29-9	ug/l	<10 U	NA	<10 U	NA
Chromium, Total	7440-47-3	ug/l	<1 U	NA	<1 U	NA
Chromium, Trivalent	16065-83-1	ug/l	<10 U	NA	<10 U	NA
Cobalt	7440-48-4	ug/l	<0.5 U	NA	<0.5 U	NA
Copper	7440-50-8	ug/l	<1 U	NA	<1 U	NA
Cyanide	57-12-5	ug/l	<5 U	NA	2 J	NA
Iron	7439-89-6	ug/l	<50 U	NA	19.2 J	NA
Lead	7439-92-1	ug/l	<1 U	NA	<1 U	NA
Magnesium	7439-95-4	ug/l	<70 U	NA	<70 U	NA
Manganese	7439-96-5	ug/l	<1 U	NA	<1 U	NA
Mercury	7439-97-6	ug/l	<0.2 U	NA	<0.2 U	NA
Nickel	7440-02-0	ug/l	<2 U	NA	<2 U	NA
Potassium	7440-09-7	ug/l	<100 U	NA	<100 U	NA
Selenium	7782-49-2	ug/l	<5 U	NA	<5 U	NA
Silver	7440-22-4	ug/l	<0.4 U	NA	<0.4 U	NA
Sodium	7440-23-5	ug/l	<100 U	NA	<100 U	NA
Thallium	7440-28-0	ug/l	0.19 J	NA	<1 U	NA
Vanadium	7440-62-2	ug/l	<5 U	NA	<5 U	NA
Zinc	7440-66-6	ug/l	<10 U	NA	<10 U	NA

Table 4
Phase II Environmental Site Investigation Report
Quality Assurance/Quality Control Sample Analytical Results

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2731 West 12th Street
Brooklyn, New York

Notes:

FB - Field Blank
TB - Trip Blank
CAS - Chemical Abstract Service
NS - No standard
ug/l - microgram per liter
NA - Not analyzed
RL - Reporting limit
<RL - Not detected

Qualifiers:

J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

APPENDIX A

GEOPHYSICAL SURVEY REPORT

GEOPHYSICAL ENGINEERING SURVEY REPORT

Industrial Property
2731 West 12th Street,
Brooklyn, New York 11224

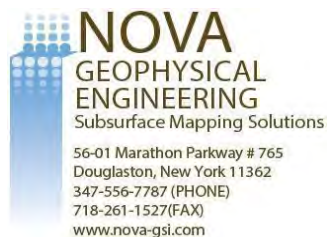
NOVA PROJECT NUMBER:
23-3102

DATED:
March 31, 2023

PREPARED FOR:
LANGAN

21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 1001-2727
www.novagsi.com

PREPARED BY:



NOVA GEOPHYSICAL SERVICES

SUBSURFACE MAPPING SOLUTIONS

56-01 Marathon Parkway #765, Douglaston, New York 11362
Ph. 347-556-7787 Fax. 718-261-1527
www.novagsi.com

March 31, 2023

Laura Grose (she/her)
Senior Staff Scientist

LANGAN

21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 10001-2727
Direct: 914.323.7432
Mobile: 914.274.7683
E: lgrose@langan.com

Re: Geophysical Engineering Survey (GES) Report
Industrial Property
2731 West 12th Street,
Brooklyn, New York 11224
Langan Project# 170697301

Dear Ms. Grose,

Nova Geophysical Services (NOVA) is pleased to provide the findings of the geophysical engineering survey (GES) at the above referenced project site: 2731 West 12th Street, New York, New York (the "Site"). The Site is located within the Brooklyn Borough with Block 7247, Lot 106 and approximately 16-acre vacant lot.

INTRODUCTION TO GEOPHYSICAL ENGINEERING SURVEY (GES)

NOVA performed a geophysical engineering survey (GES) consisting of a Ground Penetrating Radar (GPR) and Electromagnetic (EM) survey at the site. The purpose of this survey is to locate and identify utilities, underground storage tanks (USTs) and other substructures on March 27th & 28th, 2023.

The equipment selected for this investigation was a Sensors and Software NOGGIN 250 MHz ground penetrating radar (GPR) with a shielded antenna and a RadioDetection RD7100 Electromagnetic utility locator. A GPR system consists of a radar control unit, control cable, and transducer (antenna). The control unit transmits a trigger pulse at a normal repetition rate of 250 MHz. The trigger pulse is sent to the transmitter electronics in the transducer via the control cable. The transmitter electronics amplify the trigger

pulse into bipolar pulses that are radiated to the surface. The transformed pulses vary in shape and frequency according to the transducer used. In the subsurface, variations of the signal occur at boundaries where there is a dielectric contrast (void, steel, soil type, etc.). Signal reflections travel back to the control unit and are represented as color graphic images for interpolation.

A typical electromagnetic (EM) utility locating system consists of a transmitter unit and a receiver unit. The receiver unit can be used independently of the transmitter unit in order to detect utility lines with an inherent EM signature (electric utility lines, water lines, etc.). If needed a current at a specific frequency can also be placed on a utility that is being located. This can be done via the transmitter unit by either direct connection or induction via an EM field varying at specific frequency. The receiver unit is then set to the selected frequency and the electromagnetic field created by the current running through the utility can be located allowing the utility to be marked.

GEOPHYSICAL METHODS

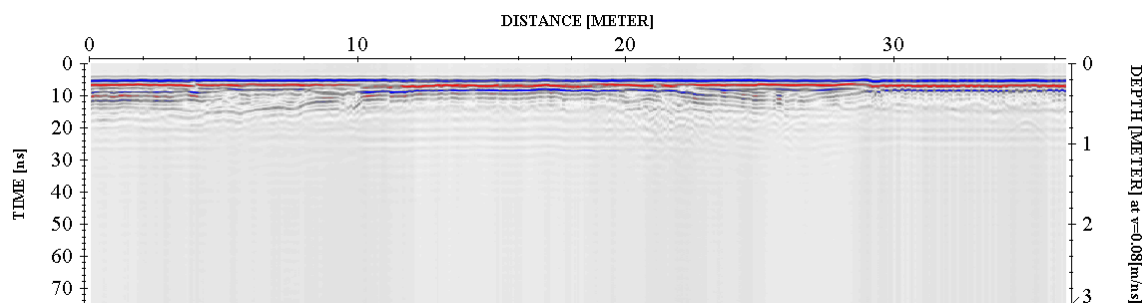
The project site was screened using GPR to search the specified area and inspected for reflections, which could be indicative of substructures and utilities within the subsurface. An EM utility locator was used to help determine the locations of utilities within the survey area.

EM data was collected and interpreted on site and suspected utilities marked as needed. GPR data profiles were collected for the areas of the Site specified by the client and processed as specified below.

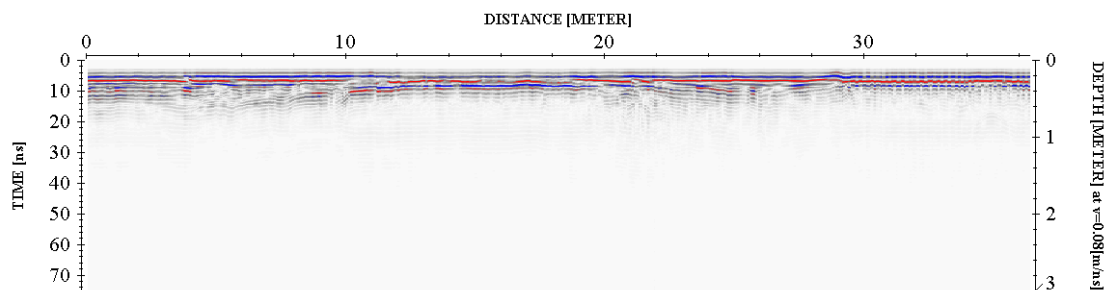
DATA PROCESSING

To improve the quality of the results and to better identify anomalies NOVA processed the collected data. The processing workflow is briefly described in this section.

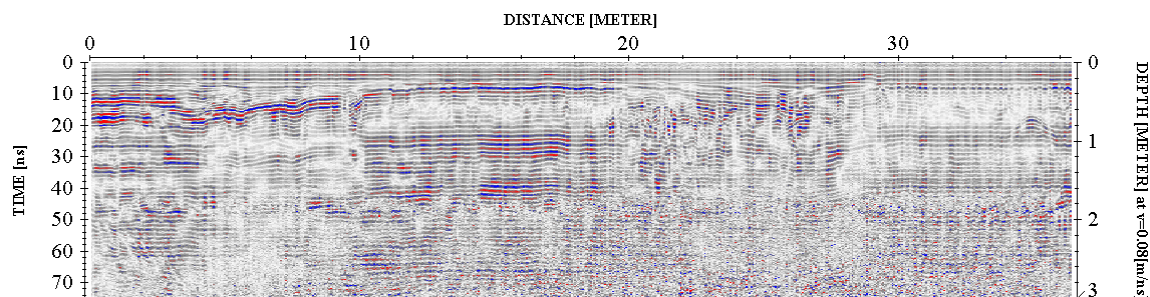
Step 1. Import Raw RAMAC data to standard processing format



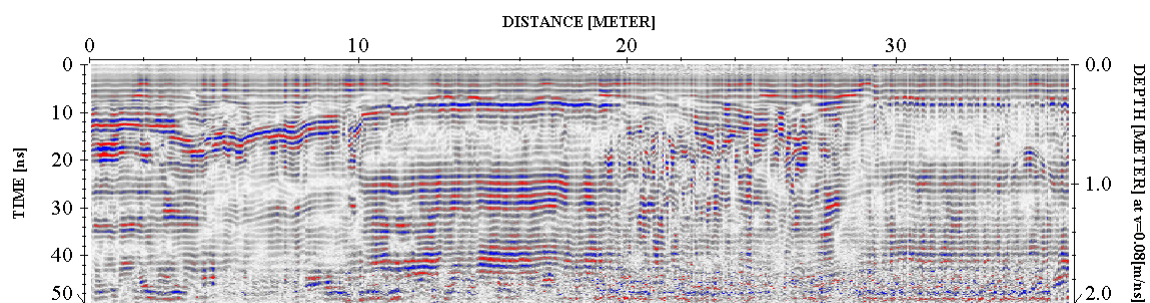
Step 2. Remove instrument noise (*dewow*)



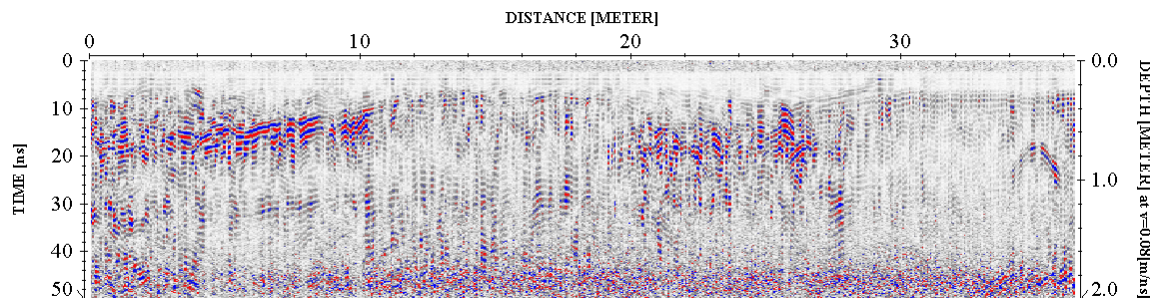
Step 3. Correct for attenuation losses (*energy decay function*)



Step 4. Remove static from bottom of profile (*time cut*)



Step 5. Mute horizontal ringing/noise (*subtracting average*)



The above example shows the significance of data processing. The last image (step 5) has higher resolution than the starting image (raw data – step 1) and represents the subsurface anomalies much more accurately.

PHYSICAL SETTINGS

NOVA observed the following physical conditions at the time of the survey.

Weather: Clear, Rain, Overcast

Temperature: 50° F

Surface: Fill, Vegetation, Gravel

Survey Parameters: A ground penetrating radar (GPR) grid scan was conducted within the survey area as shown in the survey plan. The line spacing of the grid survey was approximately 6'. Additional GPR data was collected over features of interest and proposed boring locations. A utility locator was used in conjunction with GPR throughout the survey area.

Limitations: The geophysical noise level (GNL) at the site was high due to being in an urban environment and other unknown anthropogenic noise sources. The site appears to have been covered with approximately 4 feet of fill prior to the GES, significantly reducing the ability to identify historical structures beneath the fill layer.

RESULTS

The results of the geophysical engineering survey (GES) identified the following at the project site:

- Anomalies resembling potential subsurface utilities (such as electric and water) were identified within the surveyed areas. Anomalies resembling subsurface utilities were identified but could not be connected to known utilities at the site. Additional surface structures were identified related to the subsurface utilities during the GES. The approximate locations are shown in the survey plan.
- Multiple large flat anomalies resembling a reinforced concrete slab were identified during the GES. NOVA suspects these anomalies could be related to former above ground gas storage tanks. The edges of the anomaly are shown in the survey plan where identifiable.
- A large geophysical anomaly resembling an underground storage tank (UST) was identified during the GES. NOVA suspects this to be a ferrous structure and to be approximately 6.5 feet below ground surface (BGS). Shown in the survey plan.
- An anomaly resembling a buried steel plate was identified during the GES and is shown in the survey plan.
- Two surface structures with a vent pipe and two associated manholes were identified during the GES. NOVA was unable to open the associated manholes and is cannot further classify these structures.

- NOVA cleared and marked all proposed boring locations shown in the survey plan.

If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

NOVA Geophysical Services



Levent Eskicakit, P.G., E.P.

Project Manager

Attachments:

Location Map

Survey Plan

Geophysical Images



Location Map		LEGEND
<p>NOVA Geophysical Services Subsurface Mapping Solutions 56-01 Marathon Parkway, # 765 Douglaston, New York 11362 Phone (347) 556-7787 * Fax (718) 261-1527 www.novagsi.com</p>	SITE:	Industrial Property 2731 West 12th Street, Brooklyn, New York 11224
	CLIENT:	Langan
	DATE:	March 27 th & 28 th , 2023
	AUTH:	Chris Steinley

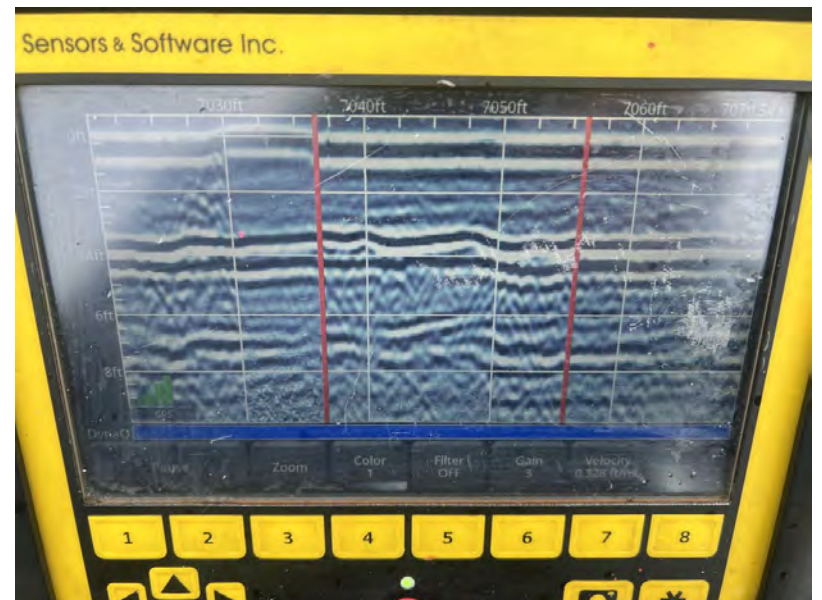


	SURVEY PLAN	LEGEND
<p>NOVA Geophysical Services</p> <p>Subsurface Mapping Solutions 56-01 Marathon Parkway, # 765 Douglaston, New York 11362 Phone (347) 556-7787 * Fax (718) 261-1527 www.novagsi.com</p>	<p>SITE: Industrial Site 2731 West 12th Street, Brooklyn, New York 11224</p> <p>CLIENT: Langan</p> <p>DATE: March 27th & 28th, 2023</p> <p>AUTH: Chris Steinley</p>	<p> Survey Area</p> <p> Boring</p>

GEOPHYSICAL IMAGES

Industrial Site

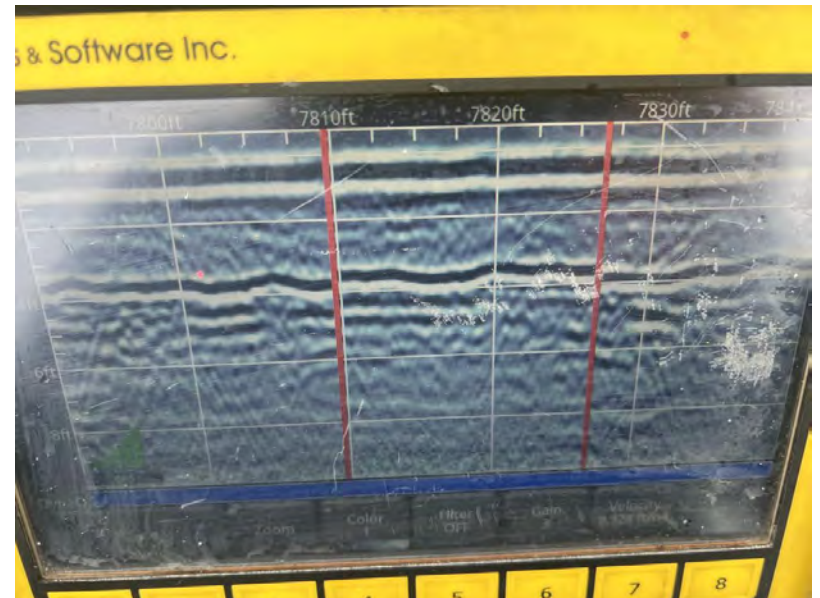
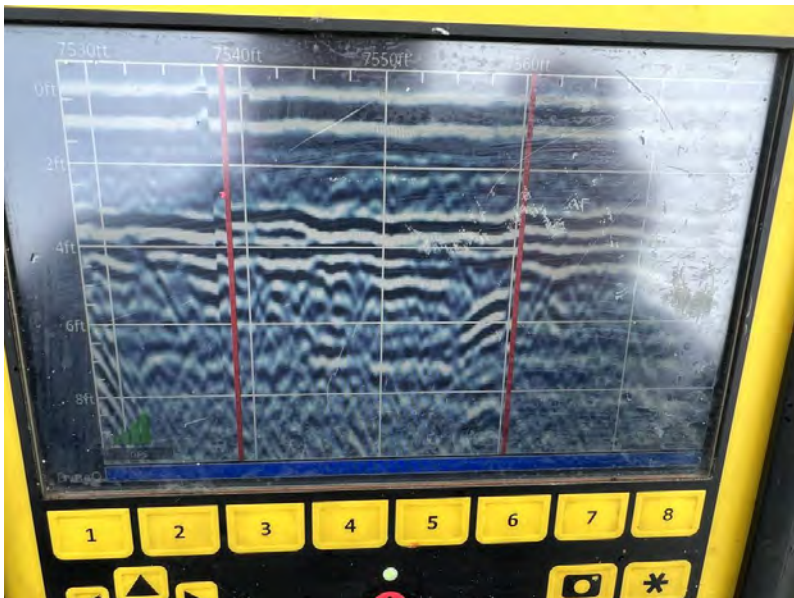
2731 West 12th Street,
Brooklyn, New York 11224
March 27th & 28th, 2023



GEOPHYSICAL IMAGES

Industrial Site

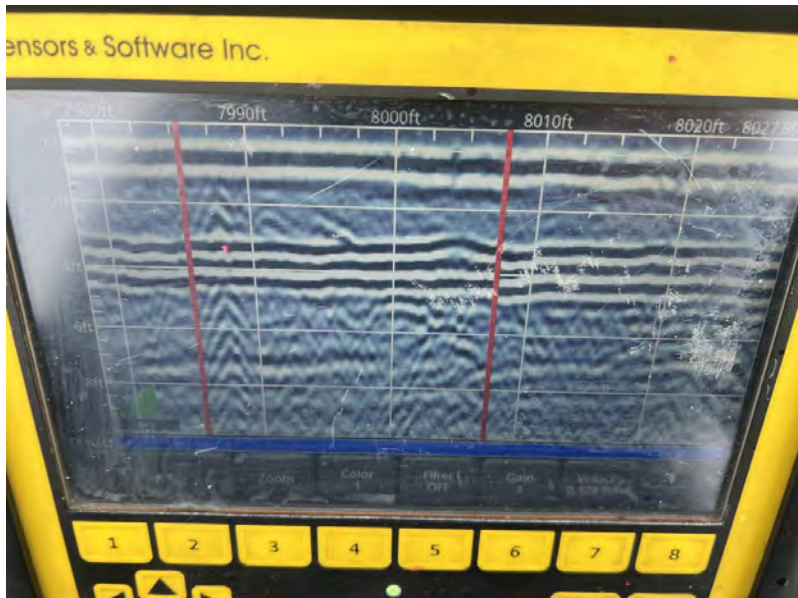
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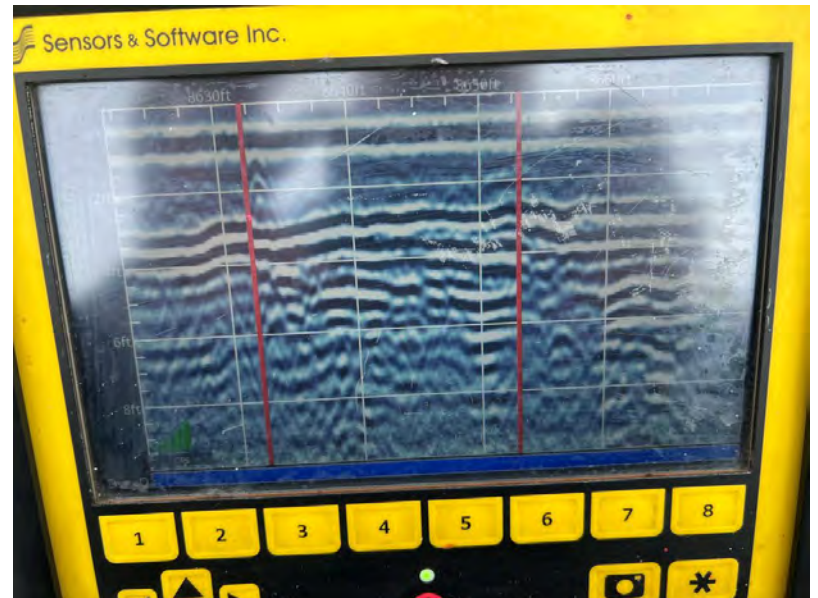
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GEOPHYSICAL IMAGES

Industrial Site

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GEOPHYSICAL IMAGES

Industrial Site

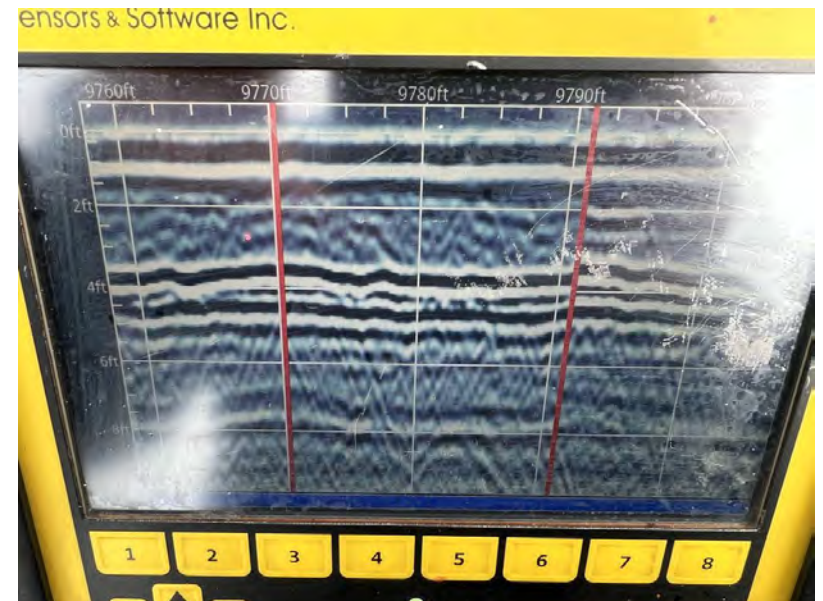
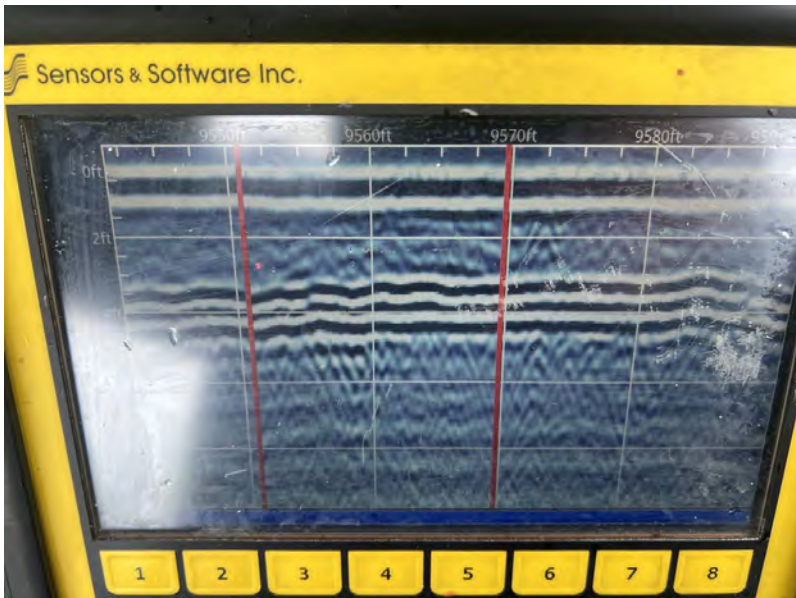
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GEOPHYSICAL IMAGES

Industrial Site

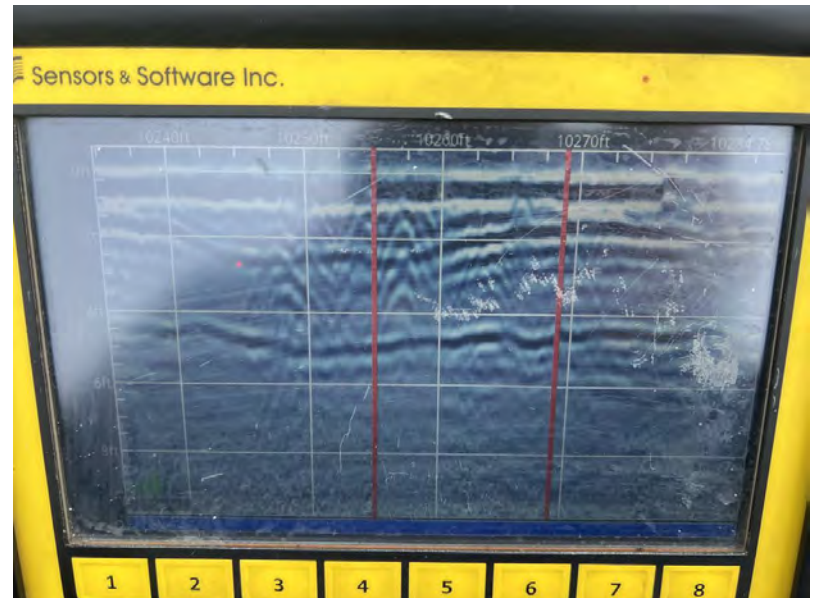
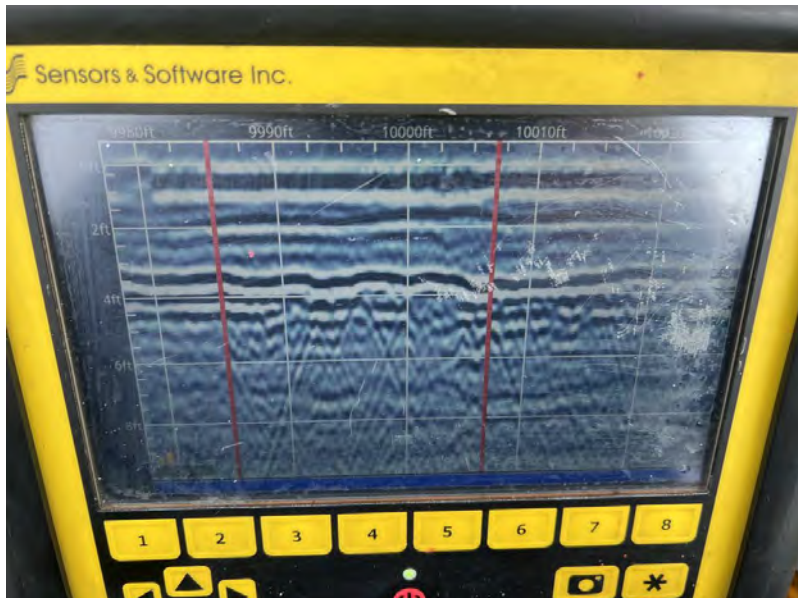
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Brooklyn, New York 11224
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GEOPHYSICAL IMAGES

Industrial Site

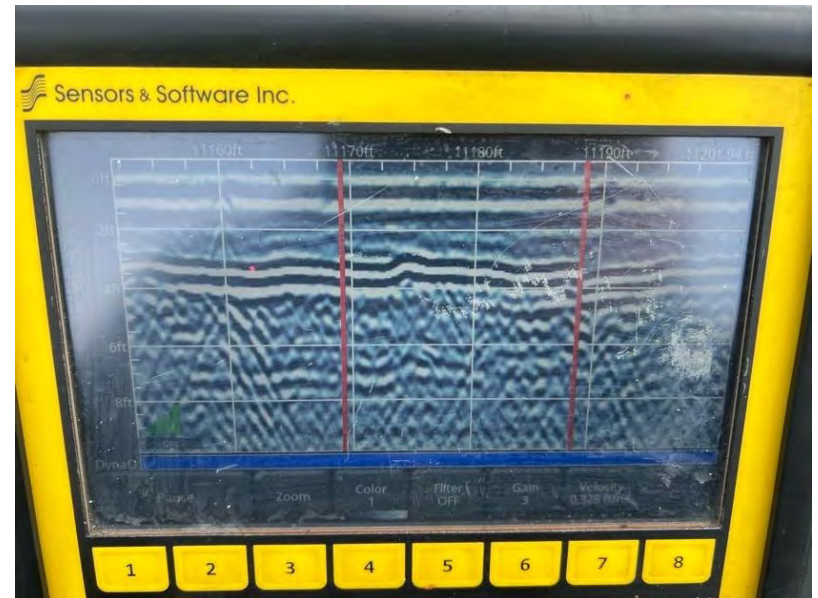
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GEOPHYSICAL IMAGES

Industrial Site

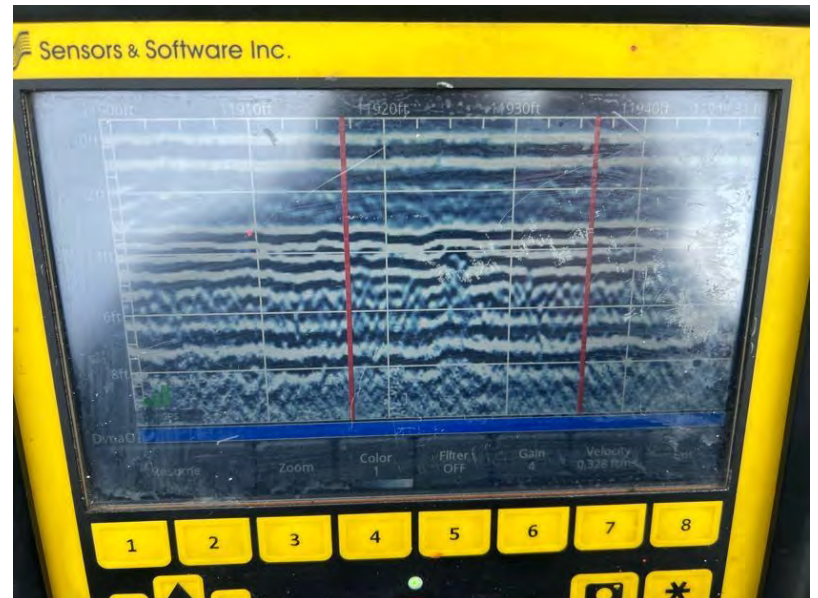
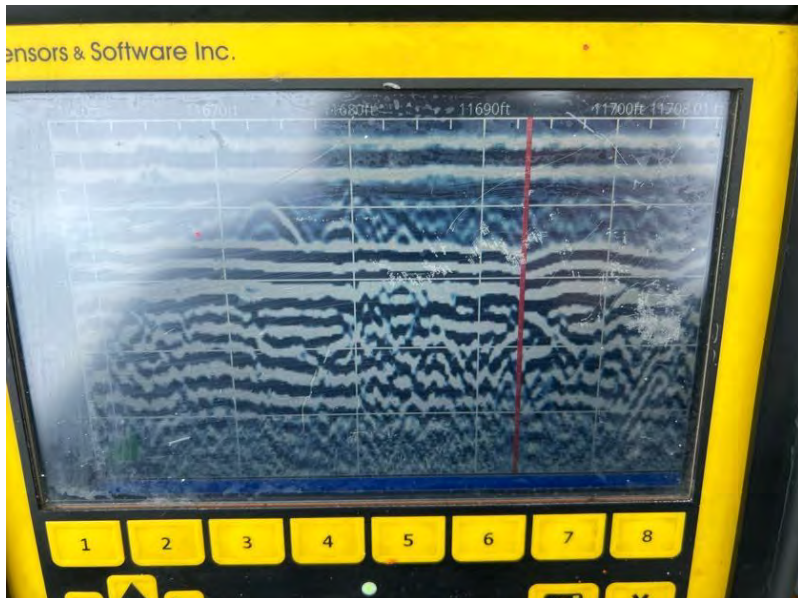
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GEOPHYSICAL IMAGES

Industrial Site

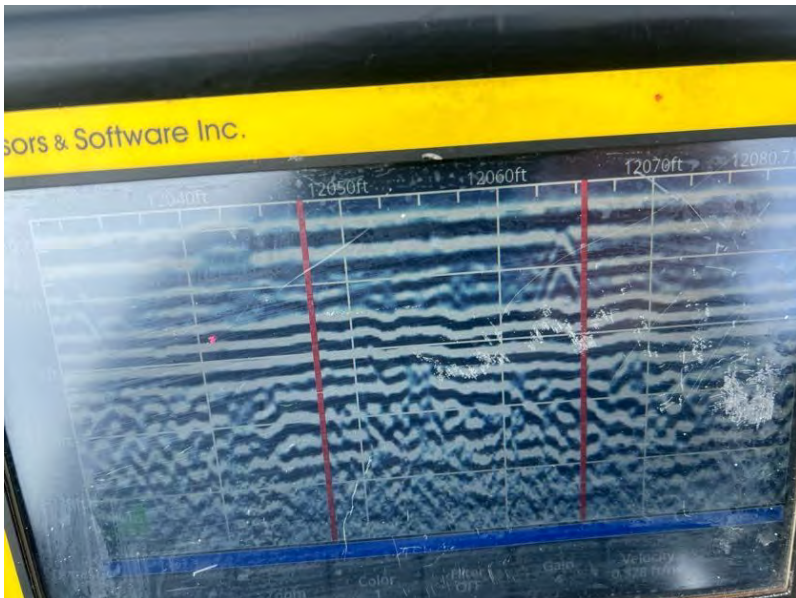
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March 27th & 28th, 2023



GEOPHYSICAL IMAGES

Industrial Site

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March 27th & 28th, 2023



GEOPHYSICAL IMAGES

Industrial Site

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Brooklyn, New York 11224
March 27th & 28th, 2023



GEOPHYSICAL IMAGES

Industrial Site

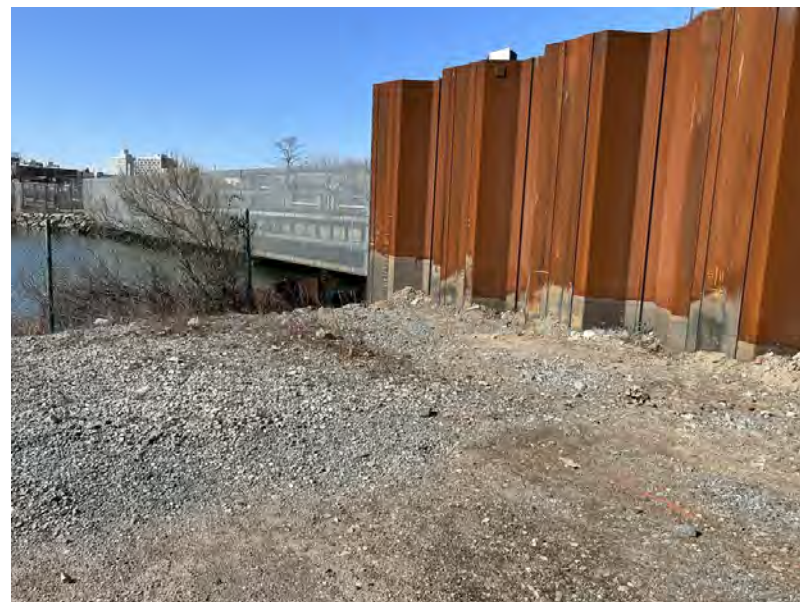
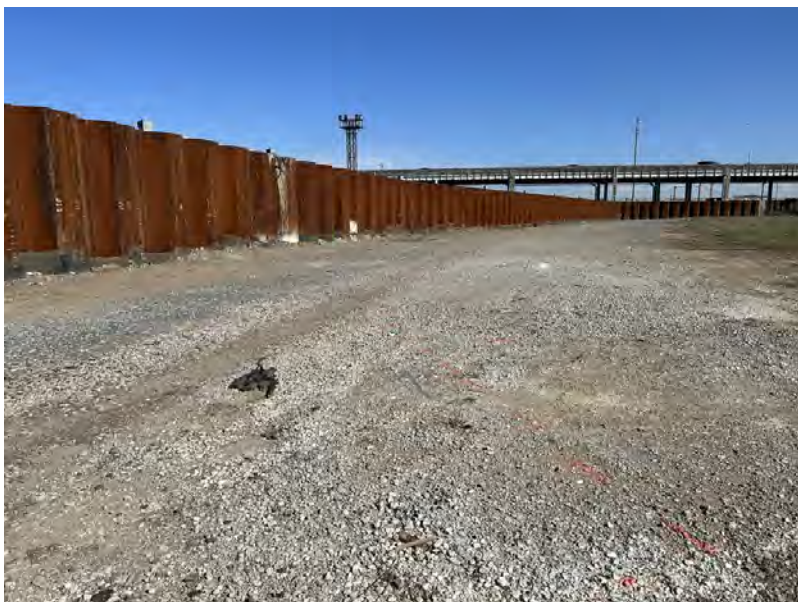
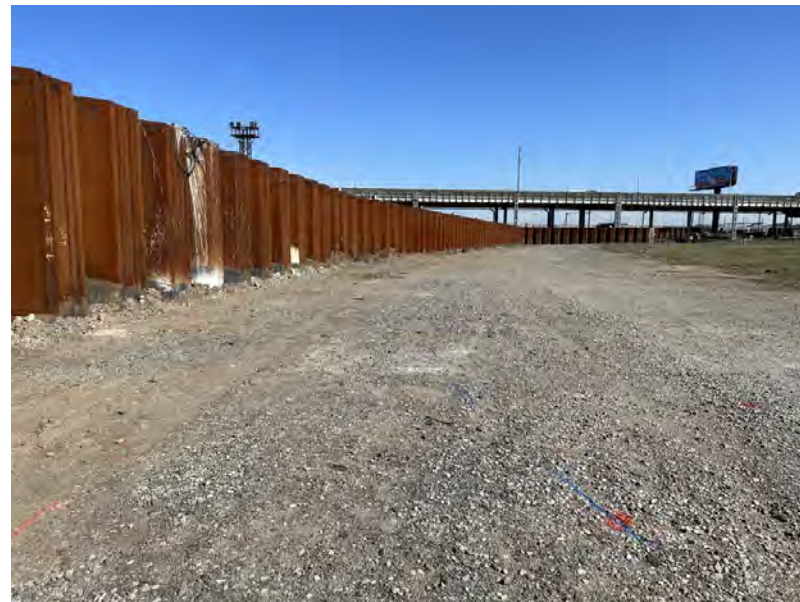
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GEOPHYSICAL IMAGES

Industrial Site

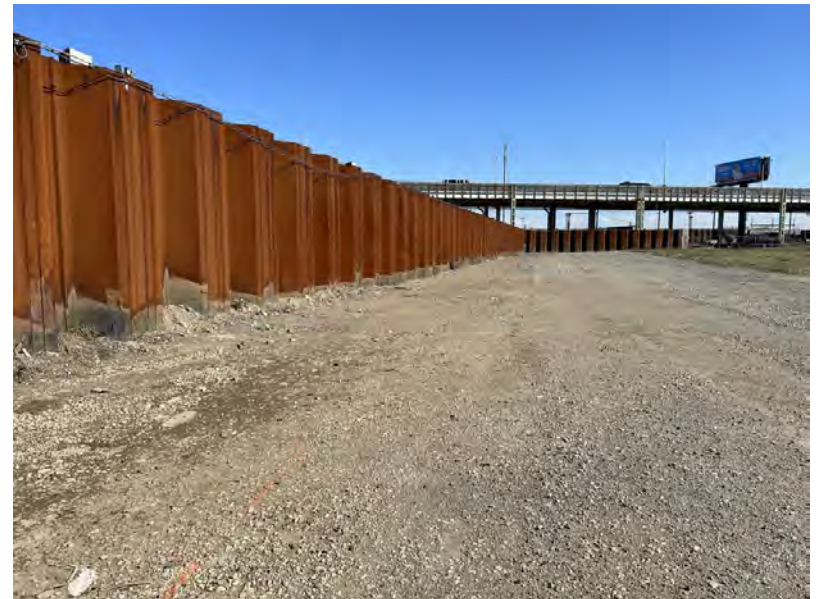
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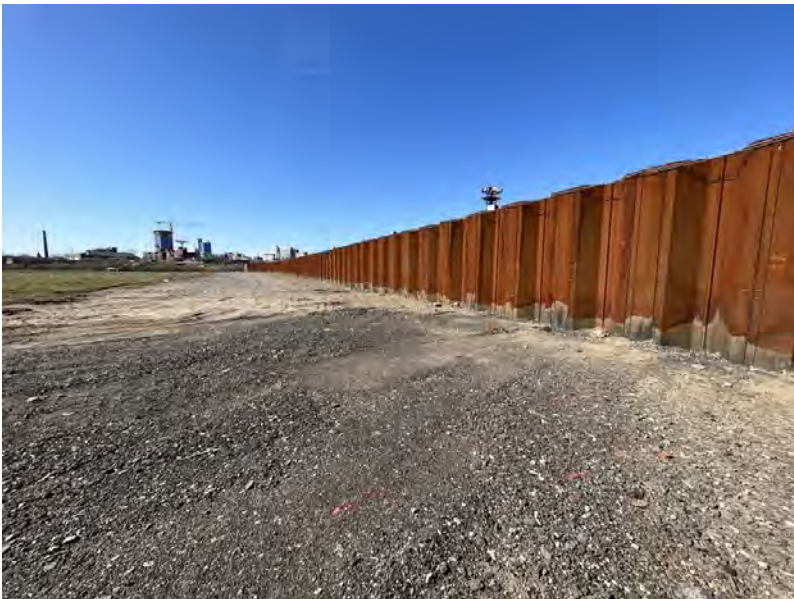
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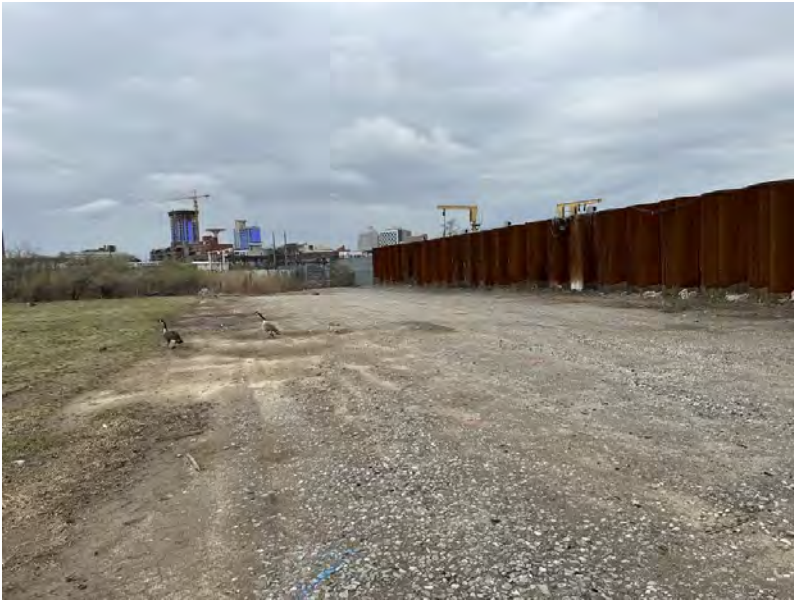
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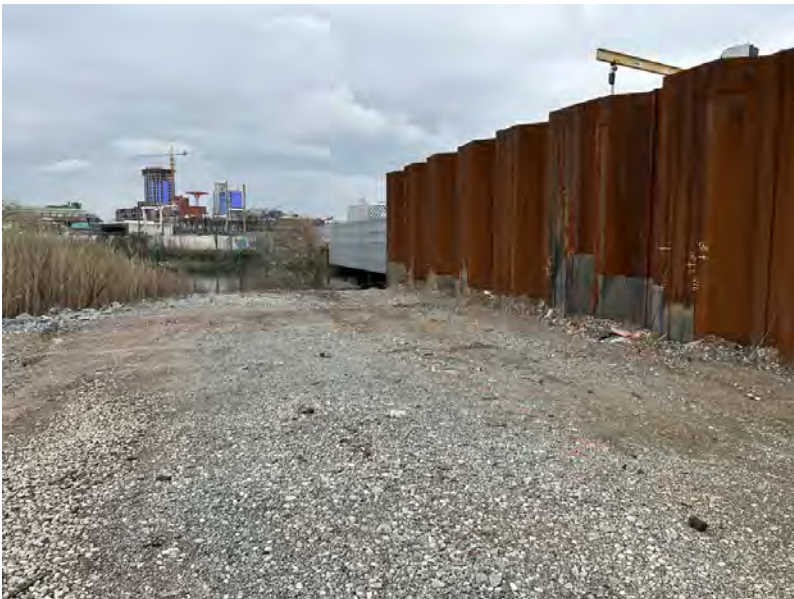
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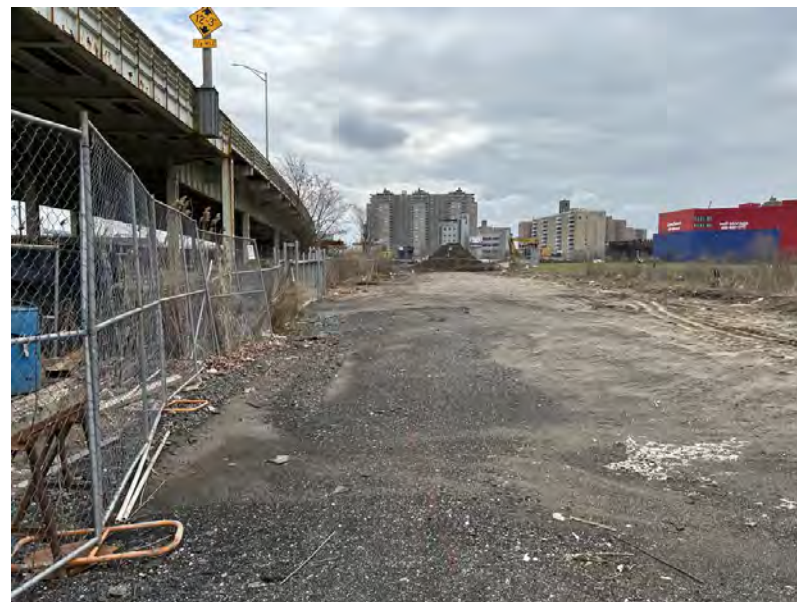
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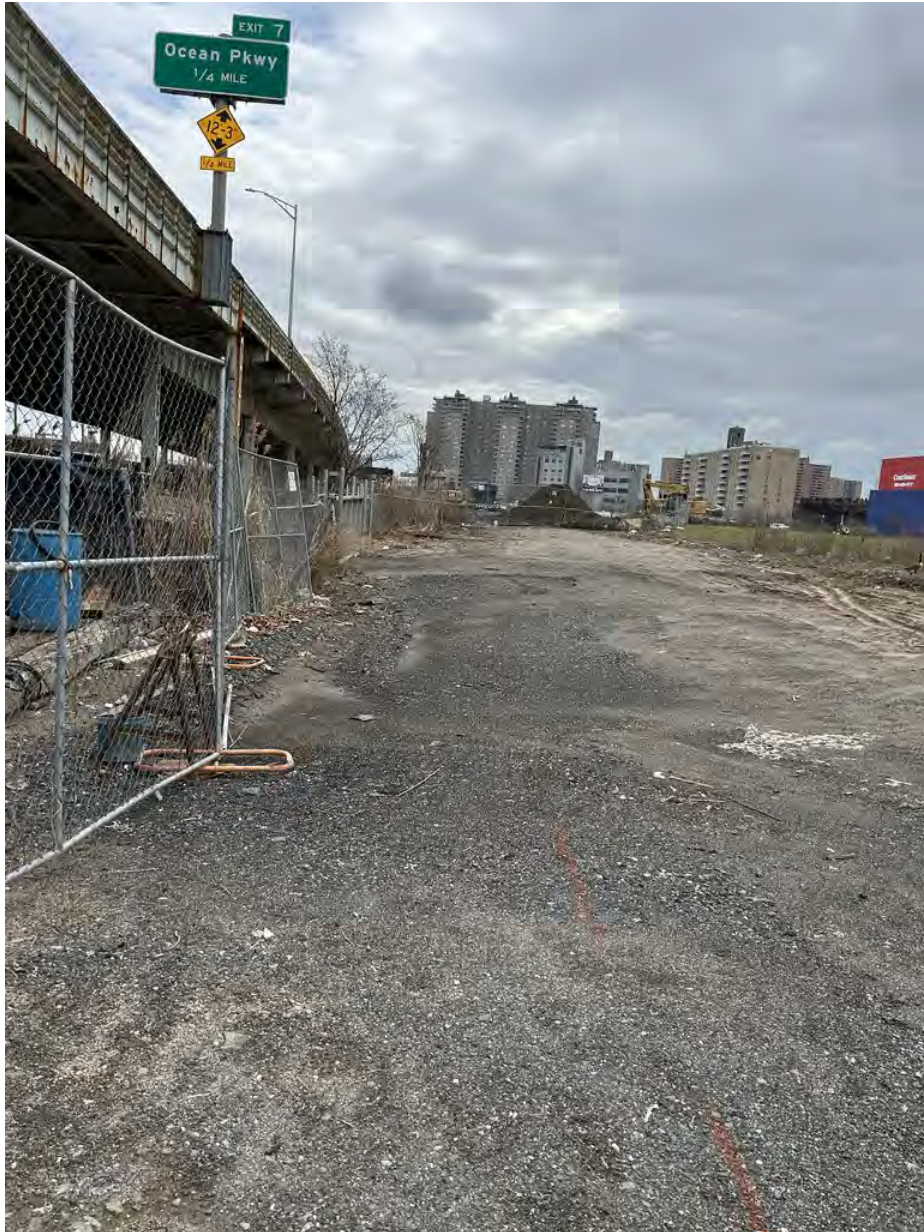
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APPENDIX B

SOIL BORING LOGS

Project				Project No.			
2731 West 12th Street				170697301			
Location				Elevation and Datum			
Brooklyn, New York				N/A			
Drilling Company				Date Started		Date Finished	
Lakewood Environmental Services, Corp.				3/31/2023		3/31/2023	
Drilling Equipment				Completion Depth		Rock Depth	
Geoprobe 6610DT Drill Rig				16.0 ft		N/E	
Size and Type of Bit				Number of Samples	Disturbed	Undisturbed	Core
2-Inch Diameter Direct Push					5	0	0
Casing Diameter (in)			Casing Depth (ft)	Water Level (ft.)	First	Completion	24 HR.
N/A			N/A		7.5	N/A	N/A
Casing Hammer		Weight (lbs)		Drop (in)		Drilling Foreman	
N/A		N/A		N/A		Tim Kelly	
Sampler				Field Engineer			
48-Inch Macrocore				Camille Quick			
Sampler Hammer		Weight (lbs)		Drop (in)			
N/A		N/A		N/A			

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0	M-1A	Macrocore	30/36		0.0	SB01_0-2
		Light brown to gray fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1	M-1B				0.0	
		Gray coarse GRAVEL (dry) [GP]	2	M-1C				0.0	
		CONCRETE	3		Macrocore			0.0	3 to 6 - Concrete slab
			4	M-2				0.0	
			5					0.0	
		Gray to tan fine SAND, trace fine gravel, trace silt (moist) [FILL] Light brown to black fine sandy fine to coarse GRAVEL, trace fine gravel, trace silt, slag (moist) [FILL]	6	M-3A	Macrocore	24/24		0.0	8.5 to 9.25 - Petroleum-like odor SB01_9-11
			7	M-3B				0.0	
		Black fine sandy fine to coarse GRAVEL, trace fine gravel, trace silt, slag (wet) [FILL] Black fine sandy fine to coarse GRAVEL, trace fine gravel, trace silt, slag, (wet) [FILL]	8	M-3C				0.0	
		Dark gray SILT, trace clay, organics (wet) [ML]	9	M-4A	Macrocore	37/48		0.0	
			10	M-4B				0.5	
		Dark gray fine SAND, trace silt (wet) [SP-SM]	11	M-4C				2.2	
		Dark gray fine SAND, trace silt (wet) [SP-SM]	12		Macrocore	42/48		0.0	14 to 15 - Petroleum-like odor
			13					0.0	
			14	M-5				0.0	
			15					0.0	
		End of Boring at 16ft.	16					0.0	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			17					0.0	
			18					0.0	
			19					0.0	
			20					0.0	

Project 2731 West 12th Street				Project No. 170697301								
Location Brooklyn, New York				Elevation and Datum N/A								
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/30/2023		Date Finished 3/30/2023						
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 19.0 ft		Rock Depth N/E						
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples Disturbed 7		Undisturbed 0 Core 0						
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.) First ▽ 8.0		Completion ▼ N/A	24 HR. ▼ N/A					
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Drilling Foreman Tim Kelly						
Sampler 48-Inch Macrocore				Field Engineer								
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Brian Kenneally						
Material Symbol	Elev. (ft) 0.0	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)			
				Number	Type	Recov. (in)	Penetr- resist BL/6in	PID Reading (ppm)				
		TOPSOIL	0	M-1A	Macrocore	48/48		0.0	4 to 7 - Concrete slab			
		Light orangish brown fine to coarse gravelly fine SAND, trace silt, clay lenses, geotextile fabric (moist) [FILL]	1					0.0				
			2	M-1B				0.0				
		Light gray fine to coarse GRAVEL (dry) [GP]	3		Macrocore			0.0				
			4	M-1C				0.0				
		CONCRETE	5		Macrocore			0.0				
			6	M-2				0.0				
			7					0.0				
		Black fine sandy fine to coarse GRAVEL, trace silt, slag (moist) [FILL]	8	M-3A	Macrocore	24/24		0.0				
			Black fine sandy fine to coarse GRAVEL, trace silt, slag (wet) [FILL]	9				M-3B		0.0		
				10				M-4A		0.1		
Black fine sandy fine to coarse GRAVEL (wet) [FILL]	11		Macrocore	24/24		4.8						
	Gray CLAY, fine sand lenses, organics (wet) [CL]	12				M-4B	30.2					
		13					95.3					
		Gray fine SAND, trace clay, organics (wet) [SP]	14	M-5A	Macrocore	24/24		120.0	SB02 9.75-11 9.75 to 11 - Black staining and solvent-like odor			
		Light gray fine SAND, trace silt, organics, (wet) [SP]	15					19.8				
			16	M-5B				11.5				
		Light gray fine SAND, trace silt (wet) [SP]	17		Macrocore	24/24		3.3				
			18	M-6				5.7				
		Light gray fine SAND, trace silt (wet) [SP]	19		Macrocore	24/24		6.4				
			20					3.7				
			21					2.3				
				End of Boring at 19ft.	22		Macrocore	48/48			6.7	14 to 16 - Coal tar-like odor
					23						14.8	
24					6.6							
			25		Macrocore	48/48		19.5	End of boring at 19 feet bgs. Backfilled with hydrated bentonite to 7.5 feet bgs and clean No. 2 sand to 6.5 feet bgs. Soil vapor point SV02 set at 7 feet bgs, and the borehole was backfilled with hydrated bentonite to grade surface.			
			26					1.4				
			27					1.6				
				28		Macrocore	48/48			1.5		
				29						2.5		
				30		Macrocore	48/48			1.2		
				31						0.5		
				32		Macrocore	48/48			6.6		
				33						4.6		
						34		Macrocore		48/48		1.2
35		0.5										
36		6.6										
	37					Macrocore	48/48		4.6			
	38								1.2			
	39					Macrocore	48/48		0.5			
	40								6.6			
	41					Macrocore	48/48		4.6			
	42								1.2			
						43		Macrocore	48/48		0.5	
			44		6.6							
			45		4.6							
				46		Macrocore	48/48		1.2			
				47					0.5			
				48		Macrocore	48/48		6.6			
				49					4.6			
				50		Macrocore	48/48		1.2			
				51					0.5			
						52		Macrocore	48/48		6.6	
53		4.6										
54		1.2										
	55					Macrocore	48/48		0.5			
	56								6.6			
	57					Macrocore	48/48		4.6			
	58								1.2			
	59					Macrocore	48/48		0.5			
	60								6.6			

Project 2731 West 12th Street				Project No. 170697301							
Location Brooklyn, New York				Elevation and Datum N/A							
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/30/2023		Date Finished 3/30/2023					
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E					
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples Disturbed 6		Undisturbed 0 Core 0					
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.) First ▾ 8.0		Completion ▾ N/A	24 HR. ▾ N/A				
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Drilling Foreman Tim Kelly					
Sampler 48-Inch Macrocore											
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Field Engineer Brian Kenneally					
<div>Material Symbol</div>	<div>Elev. (ft) 0.0</div>	Sample Description			Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
						Number	Type	Recov. (in)	Penetr- resist BL/6in	PID Reading (ppm)	
		TOPSOIL			0	M-1A	Macrocore	42/48		0.0	SB03_A_2-4
		Grayish brown fine to coarse gravelly fine SAND, trace clay (moist) [FILL]			1	M-1B				0.0	
		Light gray fine to coarse GRAVEL (dry) [GP]			2	M-1C				0.0	
		Brown fine SAND, trace silt, trace fine gravel (moist) [FILL]			3	M-1D				0.0	
		Brown fine SAND, trace silt, trace fine gravel (moist) [FILL]			4	M-2	Macrocore	12/12		0.0	5 to 7 - Concrete slab
		CONCRETE			5	M-3				0.0	
		Brown to tan fine to coarse GRAVEL, some fine to medium sand (moist) [GW]			7	M-4	Macrocore	24/24		0.0	9 to 12 - Concrete slab
		Brown to tan fine to coarse GRAVEL, some fine to medium sand (wet) [GW]			8					0.0	
		CONCRETE			9	M-5	Macrocore			4.7	
					10						
					11						
		Dark grayish brown fine SAND, trace clay, organics (wet) [SP]			12	M-6A	Macrocore	48/48		0.1	12 to 12.25 - Black staining and solvent-like odor SB03_A_12-14
		Light grayish brown fine SAND, trace silt (wet) [SP]			13					0.0	
					14					0.2	
					15	M-6B				0.1	
					16					0.0	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
					17					0.9	
					18						
			19								
			20								

Project				Project No.			
2731 West 12th Street				170697301			
Location				Elevation and Datum			
Brooklyn, New York				N/A			
Drilling Company				Date Started		Date Finished	
Lakewood Environmental Services, Corp.				3/29/2023		3/29/2023	
Drilling Equipment				Completion Depth		Rock Depth	
Geoprobe 6610DT Drill Rig				16.0 ft		N/E	
Size and Type of Bit				Number of Samples	Disturbed	Undisturbed	Core
2-Inch Diameter Direct Push					4	0	0
Casing Diameter (in)			Casing Depth (ft)	Water Level (ft.)	First	Completion	24 HR.
N/A			N/A		12.0	N/A	N/A
Casing Hammer		Weight (lbs)		Drop (in)		Drilling Foreman	
N/A		N/A		N/A		Adam Hutchinson	
Sampler				Field Engineer			
48-Inch Macrocore				Camille Quick			
Sampler Hammer		Weight (lbs)		Drop (in)			
N/A		N/A		N/A			

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0					0.0	
		Gray fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1	M-1A	Macrocore	42/48		0.0	
		Gray coarse GRAVEL (dry) [GP]	2	M-1B				0.0	
		Brown fine SAND, trace silt, trace fine gravel (moist) [FILL]	3	M-1C				0.0	
		Brown fine SAND, some fine gravel, trace silt, metal (moist) [FILL]	4		Macrocore	26/48		0.0	
			5					0.0	
			6	M-2				0.0	
		Dark gray SILT, trace sand, lumber (wet) [FILL] Brown fine SAND, some fine gravel, trace silt (moist) [FILL]	8	M-3A	Macrocore	46/48		0.0	
			9					0.0	
			10	M-3B				0.0	
		Dark gray SILT, trace clay, organics (moist) [ML]	12	M-3C	Macrocore	46/48		0.0	
		Dark gray SILT, organics (wet) [ML]	12	M-4A				0.0	
		Dark gray fine SAND, trace silt (wet) [SP-SM]	13		Macrocore	46/48		0.0	
			14	M-4B				0.0	
			15					0.0	
		End of Boring at 16ft.	16					1.8	End of boring at 16 feet bgs. Backfilled with hydrated bentonite to 3.5 feet bgs and clean No. 2 sand to 4 feet bgs. Soil vapor point SV03 set at 2.5 feet bgs, and the borehole was backfilled with hydrated bentonite to grade surface.
			17						
			18						
			19						
			20						

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/29/2023		Date Finished 3/29/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples Disturbed 5		Undisturbed 0 Core 0	
Casing Diameter (in) N/A		Casing Depth (ft) N/A		Water Level (ft.) First ∇ 8.0		Completion ▼ N/A 24 HR. ▼ N/A	
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Drilling Foreman Adam Hutchinson	
Sampler 48-Inch Macrocore				Field Engineer Camille Quick			
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A			

Material Symbol	Elev. (ft) 0.0	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr- resist BL/6in	PID Reading (ppm)	
		TOPSOIL	0					0.0	SB04_2-4
		Light brown fine SAND, trace silt, trace fine gravel (moist) [FILL]	1	M-1A	Macrocore	42/48		0.0	
			2	M-1B				0.0	
		Gray coarse GRAVEL, trace fine sand, trace silt, clay lenses, geotextile fabric (moist) [FILL]	3	M-1C				0.0	
		Dark brown fine SAND, trace silt, coarse gravel lenses (moist) [FILL]	4	M-1C				0.0	
		Dark brown to black fine SAND, some coarse gravel, trace clay, slag, brick (moist) [FILL]	5				0.0		
			6	M-2	Macrocore	28/48		0.0	
			7					0.0	
			8					0.0	
		Black fine sandy fine to coarse GRAVEL, trace clay, slag (wet) [FILL]	9					0.1	
			10	M-3	Macrocore	30/48		0.0	
			11					5.7	
			12					1.1	
		Dark gray SILT, trace clay, organics (moist) [ML]	13	M-4A				5.1	
		Dark gray fine SAND, trace clay, organics (wet) [SP-SC]	14	M-4B	Macrocore	48/48		4.4	
		Dark gray fine SAND, trace silt (wet) [SP-SM]	15	M-4C				5.8	
		16					28.7		
		17					30.9		
		18					10.9		
		19					5.5		
		20					6.2		

End of Boring at 16ft.		End of boring at 16 feet bgs. Backfilled with hydrated bentonite to 6.5 feet bgs and clean No. 2 sand to 3.5 feet bgs. Soil vapor point SV04 set at 5.5 feet bgs, and the borehole was backfilled with hydrated bentonite to grade surface.	
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Project	2731 West 12th Street			Project No.	170697301		
Location	Brooklyn, New York			Elevation and Datum	N/A		
Drilling Company	Lakewood Environmental Services, Corp.			Date Started	3/31/2023	Date Finished	
Drilling Equipment	Geoprobe 6610DT Drill Rig			Completion Depth	16.0 ft	Rock Depth	
Size and Type of Bit	2-Inch Diameter Direct Push			Number of Samples	5	Disturbed	0
Casing Diameter (in)	N/A	Casing Depth (ft)	N/A	Water Level (ft.)	First	Completion	24 HR.
Casing Hammer	N/A	Weight (lbs)	N/A	Drop (in)	N/A	Completion	N/A
Sampler	48-Inch Macrocore			Drilling Foreman	Tim Kelly		
Sampler Hammer	N/A	Weight (lbs)	N/A	Drop (in)	N/A	Field Engineer	Camille Quick

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0	M-1A	Macrocore	27/36		0.0	
		Gray fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1	M-1B				0.0	
		Gray coarse GRAVEL (dry) [GP]	2	M-1C				0.0	
		CONCRETE	3		Macrocore				3 to 6 - Concrete slab
			4	M-2					
			5						
		Dark brown to tan fine SAND, trace silt (moist) [SP-SM]	6		Macrocore	24/24		95.0	SB05_6-8
			7	M-3				201.9	
			8					226.0	
		Light brown to dark gray fine SAND, trace silt (wet) [SP-SM]	9		Macrocore	41/48		693.3	8 to 15 - Solvent-like odor and positive sheen test SB05_8-10
			10	M-4				512.7	
			11					460.5	
		Gray to dark gray fine SAND, trace silt (wet) [SP-SM]	12		Macrocore	43/48		274.1	
			13					317.7	
			14	M-5				326.4	
			15					394.1	
			16					257.3	
		End of Boring at 16ft.	17					204.4	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			18					496.5	
			19					481.5	
			20					508.3	

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/29/2023		Date Finished 3/29/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples	Disturbed 4	Undisturbed 0	Core 0
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.)	First ▽ 10.0	Completion ▼ N/A	24 HR. ▼ N/A
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A	Drilling Foreman Adam Hutchinson		
Sampler 48-Inch Macrocore							
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A	Field Engineer Camille Quick		

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0					0.0	SB06_0-2
		Light brown fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1	M-1A	Macrocore	44/48		0.0	
			2					0.0	
		Gray coarse GRAVEL (dry) [GP]	3	M-1B				0.0	
		Dark brown fine SAND, trace silt, trace coarse gravel (moist) [FILL]	4	M-1C				0.0	
		Dark brown fine SAND, some silt, coarse gravel lenses, plastic debris (moist) [FILL]	5		Macrocore	46/48		0.0	
			6	M-2				0.0	
			7					0.0	
		Dark brown to black fine SAND, some silt, coarse gravel lenses (moist) [FILL]	8		Macrocore	42/48		0.0	
			9	M-3A				0.0	
		Black fine sandy fine to coarse GRAVEL, slag (wet) [FILL]	10	M-3B				0.0	10 to 13 - Coal tar-like material 10 to 13 - Petroleum-like odor
		Dark gray SILT, trace clay, organics (wet) [ML]	11	M-3C				18.9	
		Dark gray SILT, organics [ML]	12	M-4A				2.7	
		Gray fine SAND, trace silt (wet) [SP-SM]	13		Macrocore	48/48		8.4	
			14	M-4B				5.5	SB06_12-14
			15					2.7	
			16					2.8	
			17					1.1	
			18					0.2	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			19					0.5	
			20					0.2	
								0.0	

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/29/2023		Date Finished 3/29/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples Disturbed 4		Undisturbed 0 Core 0	
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.) First ∇ 8.5		Completion ∇ N/A 24 HR. ∇ N/A	
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Drilling Foreman Adam Hutchinson	
Sampler 48-Inch Macrocore							
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Field Engineer Camille Quick	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	
▲▲▲▲	0.0	Black to gray coarse GRAVEL, trace fine sand (dry) [ASPHALT]	0	M-1A	Macrocore	46/48		0.0	SB07_0-2
		Brown to gray fine SAND, trace silt, trace fine to coarse gravel, lumber (moist) [FILL]	1					0.0	
■			2	M-1B				0.0	
		Gray coarse GRAVEL (dry) [GP]	3	M-1C				0.0	
■		Brown to dark brown fine SAND, trace silt, trace cobbles, coarse gravel lenses (moist) [FILL]	4	M-2A	Macrocore	30/48		0.0	SB07_5-6.5
		Dark brown to brown fine SAND, trace clay, trace cobbles, coarse gravel lenses, slag (moist) [FILL]	5					0.0	
■			6	M-2B				0.0	
			7					0.0	
▲		Brown fine SAND, some coarse gravel, trace clay, trace cobbles (moist) [FILL]	8	M-3A	Macrocore	40/48		0.0	
		Dark brown to black fine sandy fine to coarse GRAVEL, slag (wet) [FILL]	9					0.0	
■			10	M-3B				0.0	
			11	M-3C				5.5	
■		Brown SILT, organics (wet) [ML]	12		Macrocore	28/48		6.2	
		Brown SILT, organics (wet) [ML]	13	M-4A				2.6	
■			14					5.3	
		Dark gray fine SAND, trace silt, organics (wet) [SP-SM]	15	M-4B				1.1	
■			16		Macrocore			1.4	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
		End of Boring at 16ft.	17						
■			18						
			19						
■			20						

Project				Project No.			
2731 West 12th Street				170697301			
Location				Elevation and Datum			
Brooklyn, New York				N/A			
Drilling Company				Date Started		Date Finished	
Lakewood Environmental Services, Corp.				3/28/2023		3/28/2023	
Drilling Equipment				Completion Depth		Rock Depth	
Geoprobe 6610DT Drill Rig				16.0 ft		N/E	
Size and Type of Bit				Number of Samples	Disturbed	Undisturbed	Core
2-Inch Diameter Direct Push					4	0	0
Casing Diameter (in)			Casing Depth (ft)	Water Level (ft.)		First	Completion
N/A			N/A	12.0		12.0	N/A
Casing Hammer		Weight (lbs)		Drop (in)		24 HR.	
N/A		N/A		N/A		N/A	
Sampler				Drilling Foreman			
48-Inch Macrocore				Adam Hutchinson			
Sampler Hammer				Field Engineer			
N/A		Weight (lbs)		Drop (in)		Camille Quick	
		N/A					

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0	M-1A	Macrocore	42/48		0.0	SB08_0-2
		Gray fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1	M-1B				0.0	
			2	M-1C				0.0	
		Gray coarse GRAVEL (dry) [GP]	3	M-1D				0.0	
		Brown fine SAND, trace coarse gravel, trace silt (moist) [FILL]	4	M-2	Macrocore	40/48		0.1	8 to 9 - Coal tar-like material
		Dark brown to light brown fine SAND, some silt, coarse gravel lenses, lumber, brick, metal, slag, lumber (moist) [FILL]	5					0.0	
			6					0.1	
			7					0.2	
			8	M-3	Macrocore	42/48		0.0	
		Black fine SAND, trace silt, trace cobbles, coarse gravel lenses, slag, lumber (moist) [FILL]	9					0.2	
			10					6.7	
			11					6.7	
			12	M-4	Macrocore	24/48		2.7	11 - Positive sheen test
		Dark gray to black fine sandy fine to coarse GRAVEL, trace clay, slag (wet) [FILL]	13					8.7	
			14					15.4	
			15					0.7	
			16					0.0	SB08_12-14
		End of Boring at 16ft.	17					0.0	
			18					0.0	
			19					0.3	
			20					0.0	

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/28/2023		Date Finished 3/28/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples	Disturbed 4	Undisturbed 0	Core 0
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.)	First ▽ 9.5	Completion ▼ N/A	24 HR. ▽ N/A
Casing Hammer N/A		Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Adam Hutchinson			
Sampler 48-Inch Macrocore							
Sampler Hammer N/A		Weight (lbs) N/A	Drop (in) N/A	Field Engineer Camille Quick			

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0					0.0	SB09_2-4
		Gray fine SAND, some coarse gravel, trace silt (moist) [FILL]	1	M-1A	Macrocore	36/48		0.0	
				M-1B				0.0	
		Gray coarse GRAVEL, some fine gravel, trace fine sand (dry) [FILL]	2	M-1C				0.0	
		Dark gray fine SAND, trace silt, trace fine gravel (moist) [FILL]	3	M-1D				0.0	
		Dark gray to white coarse GRAVEL, some fine sand, trace cobbles, asphalt, brick, concrete (moist) [FILL]	4		Macrocore	32/48		0.0	
			5					0.0	
			6	M-2				0.0	
			7					0.0	
		Gray to dark brown fine SAND, some silt, trace coarse gravel, metal (moist) [FILL]	8	M-3A	Macrocore	20/48		0.0	
		Black fine sandy fine GRAVEL, trace clay (wet) [FILL]	9					0.0	
			10	M-3B				0.0	
			11					0.0	
		Black fine sandy fine GRAVEL, trace clay (wet) [FILL]	12		Macrocore	20/48		0.0	SB09_12-13.5
			13	M-4A				3.5	
		Dark gray SILT, organics (wet) [ML]	14					2.0	13.5 - Positive sheen test
			15	M-4B					
		End of Boring at 16ft.	16						End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			17						
			18						
			19						
			20						

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/27/2023		Date Finished 3/27/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples	Disturbed 4	Undisturbed 0	Core 0
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.) First ▽ 12.0		Completion ▼ N/A	24 HR. ▽ N/A
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A	Drilling Foreman Adam Hutchinson		
Sampler 48-Inch Macrocore							
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A	Field Engineer Camille Quick		

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0					0.0	SB10_2-4
			1	M-1A	Macrocore	40/48		0.0	
		Light brown fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	2	M-1B				0.0	
		Gray coarse GRAVEL (dry) [GP]	3	M-1C				0.0	
		Brown to dark brown fine SAND, trace silt, coarse gravel lenses (moist) [FILL]	4	M-1D				0.0	
			5		Macrocore	18/48		0.0	
		Brown to dark brown fine SAND, trace silt, coarse gravel lenses, brick (moist) [FILL]	6	M-2				0.0	
			7					0.0	
			8					0.0	
		Brown fine SAND, trace silt, coarse gravel lenses, brick, metal (moist) [FILL]	9					0.0	
			10	M-3	Macrocore	12/48		0.0	
			11					0.0	
			12					0.0	
		Dark gray to black fine gravelly fine SAND, lumber (wet) [FILL]	13	M-4A				0.0	
		Dark gray SILT, organics (wet) [ML]	14		Macrocore	20/48		2.5	13 - Positive sheen test
			15	M-4B				2.3	
			16						
			17						
		End of Boring at 16ft.	18						End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			19						
			20						

Project				Project No.			
2731 West 12th Street				170697301			
Location				Elevation and Datum			
Brooklyn, New York				N/A			
Drilling Company				Date Started		Date Finished	
Lakewood Environmental Services, Corp.				3/27/2023		3/27/2023	
Drilling Equipment				Completion Depth		Rock Depth	
Geoprobe 6610DT Drill Rig				16.0 ft		N/E	
Size and Type of Bit				Number of Samples	Disturbed	Undisturbed	Core
2-Inch Diameter Direct Push					4	0	0
Casing Diameter (in)			Casing Depth (ft)	Water Level (ft.)	First	Completion	24 HR.
N/A			N/A		10.0	N/A	N/A
Casing Hammer		Weight (lbs)		Drop (in)		Drilling Foreman	
N/A		N/A		N/A		Adam Hutchinson	
Sampler				Field Engineer			
48-Inch Macrocore				Camille Quick			
Sampler Hammer		Weight (lbs)		Drop (in)			
N/A		N/A		N/A			

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0	M-1A	Macrocore	36/48		0.0	SB11_2-4
		Light brown fine SAND, trace silt, trace fine gravel (moist) [FILL]	1	M-1B				0.0	
			2	M-1C				0.0	
		Gray coarse GRAVEL (dry) [GP]	3	M-1D				0.0	
		Brown to dark brown fine SAND, trace silt, fine gravel lenses (moist) [FILL]	4		Macrocore	24/48		0.0	
		Dark brown fine SAND, some silt, coarse gravel lenses (moist) [FILL]	5	M-2A				0.0	
			6	M-2B				0.0	
		Dark gray fine SAND, trace clay, lumber (moist) [FILL]	7					0.0	
			8		Macrocore	32/48		0.0	
		Dark brown to dark gray fine SAND, trace clay, coarse gravel lenses, lumber, brick, carbonized wood (moist) [FILL]	9	M-3A				1.2	
			10					0.5	
		Black fine SAND, trace silt, carbonized wood (wet) [FILL]	11	M-3B				23.6	9.5 to 10 - Coal tar-like material 10 to 10.25 - Negative sheen test SB11_11-13
			12		Macrocore	26/48		42.2	
			13					18.3	
		Dark gray to black fine sandy fine to coarse GRAVEL, trace clay, lumber, slag (wet) [FILL]	14	M-4				8.4	
			15					131.1	
		End of Boring at 16ft.	16					92.5	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			17					20.7	
			18					12.8	
			19						
			20						

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/28/2023		Date Finished 3/28/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples		Disturbed	
				4		Undisturbed	
				0		Core	
				0			
Casing Diameter (in) N/A			Casing Depth (ft) N/A	Water Level (ft.)		First ▽ 8.0	Completion ▼ N/A
						24 HR. ▽ N/A	
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Drilling Foreman Adam Hutchinson	
Sampler 48-Inch Macrocore				Field Engineer Camille Quick			
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A			

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0	M-1A	Macrocore	32/48		0.0	SB12_0-2
		Light brown to gray fine SAND, some fine to coarse gravel, trace silt, clay lenses, geotextile fabric (moist) [FILL]	1	M-1B				0.0	
		Gray coarse GRAVEL (dry) [GP]	2	M-1C				0.0	
			3					0.1	
			4					0.0	
		Gray coarse GRAVEL, trace fine sand (dry) [FILL]	5	M-2	Macrocore	20/48		0.0	
			6					0.0	
			7					0.0	
		Gray coarse GRAVEL (wet) [GP]	8	M-3A	Macrocore	20/48		0.0	
			9	M-3B				0.0	
			10					0.0	
		Gray coarse GRAVEL, some medium sand, trace silt, organics (wet) [FILL]	11	M-4A	Macrocore	36/48		0.0	13 to 15 - Petroleum-like odor SB12_13.5-15 14 to 14.5 - Positive sheen test
			12	M-4B				0.0	
			13					0.1	
		Dark gray coarse GRAVEL, some silt, trace medium sand (wet) [FILL]	14		Macrocore			0.0	
			15					0.0	
			16					0.0	
		Dark gray to gray silty CLAY, organics (moist) [CL]	17					0.0	End of boring at 16 feet bgs. Boring backfilled with hydrated bentonite to grade surface.
			18					0.0	
			19					0.0	
			20					0.0	
		End of Boring at 16ft.	16					0.0	
			17					0.0	
			18					0.0	
			19					0.0	

Project 2731 West 12th Street				Project No. 170697301			
Location Brooklyn, New York				Elevation and Datum N/A			
Drilling Company Lakewood Environmental Services, Corp.				Date Started 3/31/2023		Date Finished 3/31/2023	
Drilling Equipment Geoprobe 6610DT Drill Rig				Completion Depth 16.0 ft		Rock Depth N/E	
Size and Type of Bit 2-Inch Diameter Direct Push				Number of Samples Disturbed 5		Undisturbed 0 Core 0	
Casing Diameter (in) N/A		Casing Depth (ft) N/A		Water Level (ft.) First ∇ 7.0		Completion ▼ N/A 24 HR. ▼ N/A	
Casing Hammer N/A		Weight (lbs) N/A		Drop (in) N/A		Drilling Foreman Tim Kelly	
Sampler 48-Inch Macrocore				Field Engineer Camille Quick			
Sampler Hammer N/A		Weight (lbs) N/A		Drop (in) N/A			

Material Symbol	Elev. (ft) 0.0	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)	
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)		
		TOPSOIL	0	M-1A	Macrocore	42/48			0.0	4 to 7 - Concrete slab
		Light gray fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1						0.0	
	Gray coarse GRAVEL (dry) [GP]	2	M-1B	0.0						
	CONCRETE	3		0.0						
			4	M-1C	Macrocore				0.0	
	5			0.0						
		Mottled tan/gray/white fine GRAVEL, trace medium sand (wet) [GP]	6	M-2					0.0	
		Light gray SILT, some fine gravel, trace clay (moist) [ML]	7		0.0					
			8	M-3A	Macrocore	28/36			0.0	
		9		0.0						
		CONCRETE	10	M-3B					0.0	
		Dark gray to grayish tan fine SAND, trace silt (wet) [SP-SM]	11	M-4	Macrocore	28/48			0.0	
12			0.0							
		End of Boring at 16ft.	13						0.0	
			14	M-5	0.0					
			15		0.0					
			16		0.0					
			17		0.0					
			18		0.0					
			19		0.0					
			20		0.0					

Project				Project No.			
2731 West 12th Street				170697301			
Location				Elevation and Datum			
Brooklyn, New York				N/A			
Drilling Company				Date Started		Date Finished	
Lakewood Environmental Services, Corp.				3/29/2023		3/29/2023	
Drilling Equipment				Completion Depth		Rock Depth	
Geoprobe 6610DT Drill Rig				12.0 ft		N/E	
Size and Type of Bit				Number of Samples	Disturbed	Undisturbed	Core
2-Inch Diameter Direct Push					3	0	0
Casing Diameter (in)			Casing Depth (ft)	Water Level (ft.)	First	Completion	24 HR.
N/A			N/A		8.5	N/A	N/A
Casing Hammer		Weight (lbs)		Drop (in)		Drilling Foreman	
N/A		N/A		N/A		Adam Hutchinson	
Sampler				Field Engineer			
48-Inch Macrocore				Camille Quick			
Sampler Hammer		Weight (lbs)		Drop (in)			
N/A		N/A		N/A			

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data					Remarks (Drilling Fluid, Casing Depth, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr-resist BL/6in	PID Reading (ppm)	
	0.0	TOPSOIL	0					0.0	9 - Positive sheen test
		Gray to light brown fine SAND, trace silt, trace fine gravel, clay lenses, geotextile fabric (moist) [FILL]	1	M-1A	Macrocore	42/48		0.0	
			2	M-1B	Macrocore			0.0	
		Gray coarse GRAVEL (dry) [GP]	3	M-1C	Macrocore			0.0	
		Dark brown fine SAND, trace silt, coarse gravel lenses, slag (moist) [FILL]	4					0.0	
		Dark brown fine SAND, trace silt, coarse gravel lenses, lumber (moist) [FILL]	5					0.0	
			6	M-2	Macrocore	42/48		0.0	
			7					0.0	
		Dark brown fine SAND, trace silt, trace cobbles, coarse gravel lenses (moist) [FILL]	8	M-3A	Macrocore			0.0	
		Dark brown fine SAND, trace silt, trace cobbles, coarse gravel lenses (wet) [FILL]	9	M-3B	Macrocore			3.9	
		Black fine sandy fine GRAVEL, trace cobbles (wet) [FILL]	10	M-3C	Macrocore	42/48		1.4	
		Dark gray to dark brown SILT, organics (moist) [ML]	11	M-3D	Macrocore			0.0	
		Dark gray to gray fine SAND, trace silt (wet) [SP-SM]	12					0.8	End of boring at 16 feet bgs. Backfilled with hydrated bentonite to 5 feet bgs clean No. 2 sand to 4 feet bgs. Soil vapor point SV01 set at 6 feet bgs, and the borehole was backfilled with hydrated bentonite to grade surface.
		End of Boring at 12ft.	13					3.1	
			14					2.6	
			15						
			16						
			17						
			18						
			19						
			20						

APPENDIX C

SOIL VAPOR SAMPLING LOGS

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV01

PROJECT: 2731 West 12th Street		PROJECT NO.: 170697301	
LOCATION: Brooklyn, New York		SURFACE ELEVATION AND DATUM: N/A	
DRILLING FIRM OR LANGAN INSTALLER: Lakewood Environmental Services Corp.		INSTALLATION DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSTALLATION FOREMAN: Tim Kelly		SAMPLE DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSTALLATION EQUIPMENT: Geoprobe® 6610 DT		TYPE OF SAMPLING DEVICE: 6-Liter Summa Canister	
INSPECTOR: Camille Quick		SAMPLER: Camille Quick	
POTENTIAL SAMPLE INTERFERENCES: N/A		WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.): Temp: 32-45° F Wind: 5-7.3 mph, NW Precipitation: 0" Pressure: 30.30" Hg	
METHOD OF INSTALLATION AND PURGING: Lakewood Environmental Services Corp. advanced a Geoprobe 6610DT to approximately 6 feet below grade surface (bgs), installed 2-inch soil vapor probe, backfilled with No. 2 sand to 4 feet bgs, and sealed surface with hydrated bentonite.			
TUBING TYPE/DIAMETER: 3/16-inch ID, 1/4-inch OD Teflon-Lined Polyethylene Tubing		TYPE OF MATERIAL ABOVE SEAL: Bentonite	
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 2-Inch Polyethylene Probe		SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.): Bentonite	
BOREHOLE DIAMETER: 2.5 inches		FILTER PACK MATERIAL (Sand or Glass Beads): No. 2 Sand	
PURGE VOLUME (L):	0.032	IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	
PURGE FLOW RATE (ML/MIN):	66		
PID AFTER PURGE (PPM):	0.3	DEPTH (FEET FROM SURFACE)	NOTES
HELIUM TESTS	Pre-sampling Post-sampling		
HELIUM TEST IN BUCKET(%):	22.3% *N/A		
HELIUM TEST IN TUBE (PPM):	0.0% *N/A		
SAMPLE START TIME:	12:14		
SAMPLE STOP TIME:	14:10		
TOTAL SAMPLE TIME (MIN):	116		
REGULATOR FLOW RATE (L/MIN):	0.04		
VOLUME OF SAMPLE (LITERS):	6 L		
PID AFTER SAMPLE (PPM):	0.5		
SAMPLE MOISTURE CONTENT:	N/A		
CAN SERIAL NUMBER:	2283		
REGULATOR SERIAL NUMBER:	01616		
CAN START VACUUM PRESS. (" HG):	-30.92		
CAN STOP VACUUM PRESS. (" HG):	-5.1		
SAMPLE LOCATION SKETCH		NOTES	
See Sample Location Plan		*Depleted helium supply during pre-sampling purge; therefore, sampler was unable to conduct post-sampling helium test.	
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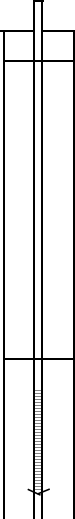
SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV02

PROJECT: 2731 West 12th Street		PROJECT NO.: 170697301	
LOCATION: Brooklyn, New York		SURFACE ELEVATION AND DATUM: N/A	
DRILLING FIRM OR LANGAN INSTALLER: Lakewood Environmental Services Corp.		INSTALLATION DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSTALLATION FOREMAN: Tim Kelly		SAMPLE DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSTALLATION EQUIPMENT: Geoprobe® 6610 DT		TYPE OF SAMPLING DEVICE: 6-Liter Summa Canister	
INSPECTOR: Camille Quick		SAMPLER: Camille Quick	
POTENTIAL SAMPLE INTERFERENCES: N/A		WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.): Temp: 32-45° F Wind: 5-7.3 mph, NW Precipitation: 0" Pressure: 30.30" Hg	
METHOD OF INSTALLATION AND PURGING: Lakewood Environmental Services Corp. advanced a Geoprobe 6610DT to approximately 7 feet below grade surface (bgs), installed 2-inch soil vapor probe, backfilled with No. 2 sand to 5 feet bgs, and sealed surface with hydrated bentonite.			
TUBING TYPE/DIAMETER: 3/16-inch ID, 1/4-inch OD Teflon-Lined Polyethylene Tubing		TYPE OF MATERIAL ABOVE SEAL: Bentonite	
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 2-Inch Polyethylene Probe		SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.): Bentonite	
BOREHOLE DIAMETER: 2.5 inches		FILTER PACK MATERIAL (Sand or Glass Beads): No. 2 Sand	
PURGE VOLUME (L):	0.038	IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	
PURGE FLOW RATE (ML/MIN):	66		
PID AFTER PURGE (PPM):	0.1	DEPTH (FEET FROM SURFACE)	
HELIUM TESTS		NOTES	
	Pre-sampling Post-sampling	<p>The diagram shows a vertical probe with a seal at the surface. Key depths are marked: 'Top of Seal' at 0.00 feet, 'Top of Pack' at 5.00 feet, and 'Probe Depth' at 7.00 feet. The probe is shown extending to the 7.00-foot mark.</p>	
HELIUM TEST IN BUCKET(%):	30.5% *N/A		
HELIUM TEST IN TUBE (PPM):	0.0% *N/A		
SAMPLE START TIME:	13:25		
SAMPLE STOP TIME:	15:11		
TOTAL SAMPLE TIME (MIN):	106		
REGULATOR FLOW RATE (L/MIN):	0.04		
VOLUME OF SAMPLE (LITERS):	6 L		
PID AFTER SAMPLE (PPM):	0.0		
SAMPLE MOISTURE CONTENT:	N/A		
CAN SERIAL NUMBER:	3325		
REGULATOR SERIAL NUMBER:	01451		
CAN START VACUUM PRESS. (" HG):	-30.81		
CAN STOP VACUUM PRESS. (" HG):	-5.04		
SAMPLE LOCATION SKETCH		NOTES	
See Sample Location Plan		*Depleted helium supply during pre-sampling purge; therefore, sampler was unable to conduct post-sampling helium test.	
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SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV03

PROJECT: 2731 West 12th Street		PROJECT NO.: 170697301	
LOCATION: Brooklyn, New York		SURFACE ELEVATION AND DATUM: N/A	
DRILLING FIRM OR LANGAN INSTALLER: Lakewood Environmental Services Corp.		INSTALLATION DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSTALLATION FOREMAN: Tim Kelly		SAMPLE DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSTALLATION EQUIPMENT: Geoprobe® 6610 DT		TYPE OF SAMPLING DEVICE: 6-Liter Summa Canister	
INSPECTOR: Camille Quick		SAMPLER: Camille Quick	
POTENTIAL SAMPLE INTERFERENCES: N/A		WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.): Temp: 32-45° F Wind: 5-7.3 mph, NW Precipitation: 0" Pressure: 30.30" Hg	
METHOD OF INSTALLATION AND PURGING: Lakewood Environmental Services Corp. advanced a Geoprobe 6610DT to approximately 2.5 feet below grade surface (bgs), installed 2-inch soil vapor probe, backfilled with No. 2 sand to 2 feet bgs, and sealed surface with hydrated bentonite.			
TUBING TYPE/DIAMETER: 3/16-inch ID, 1/4-inch OD Teflon-Lined Polyethylene Tubing		TYPE OF MATERIAL ABOVE SEAL: Bentonite	
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 2-Inch Polyethylene Probe		SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.): Bentonite	
BOREHOLE DIAMETER: 2.5 inches		FILTER PACK MATERIAL (Sand or Glass Beads): No. 2 Sand	
PURGE VOLUME (L):	0.016	IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	
PURGE FLOW RATE (ML/MIN):	68		
PID AFTER PURGE (PPM):	0.2		
HELIUM TESTS	Pre-sampling Post-sampling		
HELIUM TEST IN BUCKET(%):	29.5% *N/A	DEPTH (FEET FROM SURFACE)	
HELIUM TEST IN TUBE (PPM):	0.0% *N/A		
SAMPLE START TIME:	14:36		
SAMPLE STOP TIME:	16:36		
TOTAL SAMPLE TIME (MIN):	120		
REGULATOR FLOW RATE (L/MIN):	0.04		
VOLUME OF SAMPLE (LITERS):	6 L		
PID AFTER SAMPLE (PPM):	0.0		
SAMPLE MOISTURE CONTENT:	N/A		
CAN SERIAL NUMBER:	1060		
REGULATOR SERIAL NUMBER:	0417		
CAN START VACUUM PRESS. (" HG):	-30.56		
CAN STOP VACUUM PRESS. (" HG):	5.86	Probe Depth 2.50	
SAMPLE LOCATION SKETCH			
<div style="text-align: center;">See Sample Location Plan</div>			
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SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV04

PROJECT: 2731 West 12th Street		PROJECT NO.: 170697301																													
LOCATION: Brooklyn, New York		SURFACE ELEVATION AND DATUM: N/A																													
DRILLING FIRM OR LANGAN INSTALLER: Lakewood Environmental Services Corp.		INSTALLATION DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023																												
INSTALLATION FOREMAN: Tim Kelly		SAMPLE DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023																												
INSTALLATION EQUIPMENT: Geoprobe® 6610 DT		TYPE OF SAMPLING DEVICE: 6-Liter Summa Canister																													
INSPECTOR: Camille Quick		SAMPLER: Camille Quick																													
POTENTIAL SAMPLE INTERFERENCES: N/A		WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.): Temp: 32-45° F Wind: 5-7.3 mph, NW Precipitation: 0" Pressure: 30.30" Hg																													
METHOD OF INSTALLATION AND PURGING: Lakewood Environmental Services Corp. advanced a Geoprobe 6610DT to approximately 5.5 feet below grade surface (bgs), installed 2-inch soil vapor probe, backfilled with No. 2 sand to 3.5 feet bgs, and sealed surface with hydrated bentonite.																															
TUBING TYPE/DIAMETER: 3/16-inch ID, 1/4-inch OD Teflon-Lined Polyethylene Tubing		TYPE OF MATERIAL ABOVE SEAL: Bentonite																													
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 2-Inch Polyethylene Probe		SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.): Bentonite																													
BOREHOLE DIAMETER: 2.5 inches		FILTER PACK MATERIAL (Sand or Glass Beads): No. 2 Sand																													
PURGE VOLUME (L):	0.030	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">IMPLANT/PROBE DETAILS</th> <th style="text-align: center;">DEPTH</th> <th style="text-align: center;">NOTES</th> </tr> <tr> <th colspan="2" style="text-align: center;">(SEAL, FILTER, ETC.)</th> <th style="text-align: center;">(FEET FROM SURFACE)</th> <th></th> </tr> <tr> <td style="text-align: center;">SURFACE</td> <td style="text-align: center;">SURFACE</td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Top of Seal</td> <td style="text-align: center;">0.00</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Top of Pack</td> <td style="text-align: center;">3.50</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">Probe Depth</td> <td style="text-align: center;">5.50</td> <td></td> </tr> </table>		IMPLANT/PROBE DETAILS		DEPTH	NOTES	(SEAL, FILTER, ETC.)		(FEET FROM SURFACE)		SURFACE	SURFACE				Top of Seal	0.00			Top of Pack	3.50			Probe Depth	5.50					
IMPLANT/PROBE DETAILS				DEPTH	NOTES																										
(SEAL, FILTER, ETC.)		(FEET FROM SURFACE)																													
SURFACE	SURFACE																														
	Top of Seal	0.00																													
	Top of Pack	3.50																													
	Probe Depth	5.50																													
PURGE FLOW RATE (ML/MIN):	66																														
PID AFTER PURGE (PPM):	0.4																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">HELIUM TESTS</th> </tr> <tr> <td style="text-align: center;">Pre-sampling</td> <td style="text-align: center;">Post-sampling</td> </tr> <tr> <td>HELIUM TEST IN BUCKET(%):</td> <td style="text-align: center;">30.6% *N/A</td> </tr> <tr> <td>HELIUM TEST IN TUBE (PPM):</td> <td style="text-align: center;">0.0% *N/A</td> </tr> <tr> <td>SAMPLE START TIME:</td> <td style="text-align: center;">11:55</td> </tr> <tr> <td>SAMPLE STOP TIME:</td> <td style="text-align: center;">13:32</td> </tr> <tr> <td>TOTAL SAMPLE TIME (MIN):</td> <td style="text-align: center;">97</td> </tr> <tr> <td>REGULATOR FLOW RATE (L/MIN):</td> <td style="text-align: center;">0.04</td> </tr> <tr> <td>VOLUME OF SAMPLE (LITERS):</td> <td style="text-align: center;">6 L</td> </tr> <tr> <td>PID AFTER SAMPLE (PPM):</td> <td style="text-align: center;">0.8</td> </tr> <tr> <td>SAMPLE MOISTURE CONTENT:</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>CAN SERIAL NUMBER:</td> <td style="text-align: center;">2265</td> </tr> <tr> <td>REGULATOR SERIAL NUMBER:</td> <td style="text-align: center;">1589</td> </tr> <tr> <td>CAN START VACUUM PRESS. (" HG):</td> <td style="text-align: center;">-31.56</td> </tr> <tr> <td>CAN STOP VACUUM PRESS. (" HG):</td> <td style="text-align: center;">-5.09</td> </tr> </table>		HELIUM TESTS		Pre-sampling	Post-sampling	HELIUM TEST IN BUCKET(%):	30.6% *N/A	HELIUM TEST IN TUBE (PPM):	0.0% *N/A	SAMPLE START TIME:	11:55	SAMPLE STOP TIME:	13:32	TOTAL SAMPLE TIME (MIN):	97	REGULATOR FLOW RATE (L/MIN):	0.04	VOLUME OF SAMPLE (LITERS):	6 L	PID AFTER SAMPLE (PPM):	0.8	SAMPLE MOISTURE CONTENT:	N/A	CAN SERIAL NUMBER:	2265	REGULATOR SERIAL NUMBER:	1589	CAN START VACUUM PRESS. (" HG):	-31.56	CAN STOP VACUUM PRESS. (" HG):	-5.09
HELIUM TESTS																															
Pre-sampling	Post-sampling																														
HELIUM TEST IN BUCKET(%):	30.6% *N/A																														
HELIUM TEST IN TUBE (PPM):	0.0% *N/A																														
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PID AFTER SAMPLE (PPM):	0.8																														
SAMPLE MOISTURE CONTENT:	N/A																														
CAN SERIAL NUMBER:	2265																														
REGULATOR SERIAL NUMBER:	1589																														
CAN START VACUUM PRESS. (" HG):	-31.56																														
CAN STOP VACUUM PRESS. (" HG):	-5.09																														
SAMPLE LOCATION SKETCH		NOTES																													
See Sample Location Plan		*Depleted helium supply during pre-sampling purge; therefore, sampler was unable to conduct post-sampling helium test.																													
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AIR SAMPLING LOG SHEET

Sample Number: AA01

PROJECT: 2731 West 12th Street		PROJECT NO.: 170697301	
LOCATION: Brooklyn, New York		SURFACE ELEVATION AND DATUM: N/A	
SAMPLER: Camille Quick		SAMPLE DATE STARTED: 3/30/2023	DATE FINISHED: 3/30/2023
INSPECTOR: Camille Quick		TYPE OF SAMPLING DEVICE: 6-Liter Summa Canister	
POTENTIAL SAMPLE INTERFERENCES: N/A		WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):	
		Temp:	32-45° F
		Wind:	5-7.3 mph, NW
		Precipitation:	0"
		Pressure:	30.30" Hg
METHOD OF INSTALLATION AND SAMPLING: Langan field screened the sample location with a MiniRAE 3000 photoionization detector prior to sampling. Sample consisted of 6 L Summa canister fitted with an 2-hour flow control valve. The flow controller was zeroed and valve opened to initiate the 2-hour sample collection. The sample and flow controller were checked each hour during sampling to ensure proper operation.			
SAMPLE DETAILS		SAMPLE LOCATION SKETCH	
HEIGHT ABOVE GROUND (FT):	3	See Sample Location Plan	
PID BEFORE SAMPLE (PPM):	0.0		
SAMPLE START TIME:	12:32		
SAMPLE STOP TIME:	14:32		
TOTAL SAMPLE TIME (MIN):	120		
REGULATOR FLOW RATE (L/MIN):	0.04		
VOLUME OF SAMPLE (LITERS):	4.8		
PID AFTER SAMPLE (PPM):	0.0		
SAMPLE MOISTURE CONTENT:	N/A		
CAN SERIAL NUMBER:	2907		
REGULATOR SERIAL NUMBER:	1707		
CAN START VACUUM PRESS. (" HG):	-30.8		
CAN STOP VACUUM PRESS. (" HG):	-5.79		
NOTES			
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APPENDIX D

DATA USABILITY SUMMARY REPORTS

1 University Square Drive Princeton, NJ 08540 T: 609.282.8000
Mailing Address: 1 University Square Drive Princeton, NJ 08540

To: Elizabeth Adkins, Langan Project Engineer

From: Joe Conboy, Langan Senior Staff Chemist

Date: April 19, 2023

Re: Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Samples
Langan Project No.: 170697301

This memorandum presents the findings of an analytical data validation from the analysis of soil samples collected in March 2023 by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C (Langan) at 2731 West 12th Street. The samples were analyzed by Alpha Analytical Laboratories, Inc. (New York State Department of Health [NYSDOH] Environmental Laboratory Approval Program [ELAP] registration # 11148) for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), herbicides, polychlorinated biphenyls (PCB), pesticides, metals, cyanide (CN), hexavalent chromium (CrVI), and trivalent chromium (CrIII) by the methods specified below.

- VOCs by SW-846 Method 8260D
- SVOCs by SW-846 Method 8270E
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Methods 6010D/7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)

Table 1, attached, summarizes the laboratory and client sample identification numbers, sample collection dates, level of data validation, and analytical parameters subject to review.

Validation Overview

This data validation was performed in accordance with the following guidelines, where applicable:

- United States Environmental Protection Agency (USEPA) Region II Standard Operating Procedures (SOP) for Data Validation

Technical Memorandum

Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Samples
Langan Project No.: 170697301
April 19, 2023 Page 2 of 14

- USEPA Contract Laboratory Program “National Functional Guidelines for Organic Superfund Methods Data Review” (EPA 540- R-20-005, November 2020)
- USEPA Contract Laboratory Program “National Functional Guidelines for Inorganic Superfund Methods Data Review” (EPA 540- R-20-005, November 2020), and
- published analytical methodologies.

The following acronyms may be used in the discussion of data-quality issues:

%D	Percent Difference	MB	Method Blank
CCV	Continuing Calibration Verification	MDL	Method Detection Limit
FB	Field Blank	MS	Matrix Spike
FD	Field Duplicate	MSD	Matrix Spike Duplicate
ICAL	Initial Calibration	RF	Response Factor
ICV	Initial Calibration Verification	RL	Reporting Limit
ISTD	Internal Standard	RPD	Relative Percent Difference
LCL	Lower Control Limit	RSD	Relative Standard Deviation
LCS	Laboratory Control Sample	TB	Trip Blank
LCSD	Laboratory Control Sample Duplicate	UCL	Upper Control Limit

Tier 1 data validation is based on completeness and compliance checks of sample-related QC results including: sample receipt documentation; analytical holding times; sample preservation; blank results (method, field, and trip); surrogate recoveries; MS/MSD recoveries and RPDs values; field duplicate RPDs, laboratory duplicate RPDs, and LCS/LCSD recoveries and RPDs. All 5 SDGs underwent Tier 1 validation review.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA guidelines and our best professional judgment:

- R** – The sample results are unusable because certain criteria were not met when generating the data. The analyte may or may not be present in the sample.
- J** – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ** – The analyte was not detected at a level greater than or equal to the reporting limit; however, the reported reporting limit is approximate and may be inaccurate or imprecise.
- U** – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- NJ** – The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

Technical Memorandum

Data Usability Summary Report
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Langan Project No.: 170697301
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If any validation qualifiers are assigned, these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are considered invalid and are not technically usable for data interpretation. Data that is otherwise qualified because of minor data-quality anomalies are usable, as qualified in Table 2 (attached).

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260D

L2316244

The sample SB09_12-13.5 exhibited a percent recovery above the UCL for the surrogate 4-bromofluorobenzene (278%). The associated detected results are qualified as J because of potential high bias.

The sample SB12_0-2 exhibited a percent recovery above the UCL for the surrogate dibromofluoromethane (143%). The associated detected results are qualified as J because of potential high bias.

The LCS and/or LCSD for batch WG1762102 exhibited percent recoveries above the UCL for carbon disulfide (171%, 167%) and 1,2,4,5-tetramethylbenzene (133%). The associated detected results in samples SB09_12-13.5 and SB12_0-2 are qualified as J because of potential high bias.

The LCS/LCSD for batch WG1762102 exhibited RPDs above the control limit for 1,2-dibromo-3-chloropropane (32%), naphthalene (35%), 1,2,3-trichlorobenzene (31%), and 1,2,4,5-tetramethylbenzene (31%). The associated results in samples SB09_12-13.5 and SB12_0-2 are qualified as J or UJ because of potential indeterminate bias.

The LCS/LCSD for batch WG1762105 exhibited RPDs above the control limit for 1,2-dibromo-3-chloropropane (32%), naphthalene (35%), 1,2,3-trichlorobenzene (31%), and 1,2,4,5-tetramethylbenzene (31%). The associated results in sample SB12_13.5-15 are qualified as J or UJ because of potential indeterminate bias.

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Langan Project No.: 170697301
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L2316548

The MB for batch WG1762473 exhibited detections of 1,2,4,5-tetramethylbenzene (0.51 ug/kg), cymene (0.28 ug/kg), and naphthalene (1.6 ug/kg). The associated results in samples SB04_2-4, SB06_0-2, and SB07_0-2 are qualified as U at the reporting limit or as J because of potential blank contamination.

The LCS/LCSD for batch WG1762469 exhibited RPDs above the control limit for hexachlorobutadiene (32%) and 1,2,4-trichlorobenzene (35%). The associated results in sample SB06_12-14 are qualified as UJ because of potential indeterminate bias.

The LCS/LCSD for batch WG1762469 exhibited RPDs above the control limit for hexachlorobutadiene (32%) and 1,2,4-trichlorobenzene (35%). The associated results in samples SB04_2-4, SB06_0-2, and SB07_0-2 are qualified as UJ because of potential indeterminate bias.

L2316797

The MB for batch WG1762473 exhibited detections of cymene (0.28 ug/kg), naphthalene (1.6 ug/kg), n-butylbenzene (0.4 ug/kg), sec-butylbenzene (0.25 ug/kg), and t-butylbenzene (0.15 ug/kg). The associated results in sample SB03_A_12-14 are qualified as U at the reporting limit or as J because of potential blank contamination.

The MB for batch WG1763422 exhibited detections of ethylbenzene (7.6 ug/kg), styrene (17 ug/kg), and naphthalene (160 ug/kg). The associated results in sample SB02_9.75-11 (4/6/23 analysis) are qualified as U at the reporting limit because of potential blank contamination.

The LCS for batch WG1763422 exhibited a percent recovery below the LCL for trans-1,4-dichloro-2-butene (69%). The associated results in sample SB02_9.75-11 (4/6/23 analysis) are qualified as UJ because of potential low bias.

The LCS/LCSD for batch WG1762473 exhibited percent recoveries above the UCL for carbon disulfide (141%, 139%). The associated results in sample SB03_A_12-14 are qualified as J because of potential high bias.

The LCS/LCSD for batch WG1762473 exhibited RPDs above the control limit for 1,2,4-trichlorobenzene (35%) and hexachlorobutadiene (32%). The associated results in sample SB03_A_12-14 are qualified as UJ because of potential indeterminate bias.

L2317033

The MB for batch WG1763422 exhibited a detection of ethylbenzene (7.6 ug/kg), naphthalene (160 ug/kg), and styrene (17 ug/kg). The associated results in samples SB01_9-11, SB05_6-8

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(4/6/23 00:15 analysis), SB05_8-10 (4/6/23 00:35 analysis), and SB13_12-14 (4/6/23 01:34 analysis) are qualified as J because of potential blank contamination.

The MB for batch WG1763657 exhibited a detection of naphthalene (0.99 ug/kg). The associated results in sample SB01_0-2 are qualified as U at the reporting limit because of potential blank contamination.

The sample SB05_6-8 exhibited a percent recovery above the UCL for the surrogate 4-bromofluorobenzene (4/5/23 12:23 analysis) (205%). The associated results are qualified as J because of potential high bias.

The sample SB05_8-10 exhibited a percent recovery above the UCL for the surrogate 4-bromofluorobenzene (133%). The associated results are qualified as J because of potential high bias.

The LCS for batch WG1763422 exhibited a percent recovery below the LCL for trans-1,4-dichloro-2-butene (69%). The associated results in samples SB01_9-11 and SB13_12-14 are qualified as UJ because of potential low bias.

SVOCs by SW-846 Method 8270E

L2315966

The LCS/LCSD for batch WG1760464 exhibited a percent recovery below the LCL for 4-chloroaniline (30%, 26%). The associated results in samples SB10_12-13.5, SB10_2-4, SB11_12-14, SB11_2-4, and SODUP01_032723 are qualified as UJ because of potential low bias.

L2316548

The LCS/LCSD for batch WG1761490 exhibited a percent recovery below the LCL for 4-chloroaniline (34%, 35%). The associated results in sample SB04_13-15, SB06_0-2, SB06_12-14, and SB07_5-6.5 are qualified as UJ because of potential low bias.

The LCS/LCSD for batch WG1761604 exhibited a RPD above the control limit for phenol (50%). The associated results in sample SB07_0-2 are qualified as UJ because of potential indeterminate bias.

The LCS for batch WG1762302 exhibited a percent recovery below the LCL for 1,4-dioxane (38%). The associated results in sample SB04_2-4 are qualified as UJ because of potential low bias.

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L2316797

The sample SB03_A_2-4 (4/6/23 analysis) exhibited percent recoveries below the LCL for the surrogates 2,4,6-tribromophenol (0%) and 2-fluorophenol (0%). The associated acid fraction results are qualified as UJ because of potential low bias.

The sample SB03_A_2-4 (4/5/23 analysis) exhibited percent recoveries below the LCL for the surrogates 2-fluorophenol (3%) and 2,4,6-tribromophenol (0%). The associated acid fraction results are qualified as J or UJ because of potential low bias.

The LCSD for batch WG1761604 exhibited a percent recovery above the UCL for phenol (92%). The associated detected results in samples SB02_9.75-11, SB03_A_12-14, and SB03_A_2-4 are qualified as J because of potential high bias.

L2317033

The MB for batch WG1762302 exhibited a detection of naphthalene (44 ug/kg). The associated results in samples SB01_0-2, SB01_9-11, SB05_6-8, SB05_8-10, SB13_12-14, and SODUP02_033123 are qualified as U at the reporting limit or as J because of potential blank contamination.

The LCS for batch WG1762302 exhibited a percent recovery below the LCL for 1,4-dioxane (38%). The associated results in samples SB01_0-2, SB01_9-11, SB05_6-8, SB05_8-10, SB13_12-14, and SODUP02_033123 are qualified as UJ because of potential low bias.

Pesticides by SW-846 Method 8081B

L2315966

The sample SB10_2-4 exhibited RPDs above the control limit between the primary and secondary GC columns for 4,4'-DDT, alpha chlordane, and heptachlor epoxide. The associated results are qualified as J because of potential indeterminate bias.

The sample SB11_2-4 exhibited a RPD above the control limit between the primary and secondary GC columns for 4,4'-DDT. The associated results are qualified as J because of potential indeterminate bias.

The sample SODUP01_032723 exhibited RPDs above the control limit between the primary and secondary GC columns for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha chlordane, endosulfan sulfate, and gamma chlordane (trans). The associated results are qualified as J because of potential indeterminate bias.

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L2316244

The LCS/LCSD for batch WG1761056 exhibited a RPD above the control limit for numerous compounds (ranging from 31% - 35%). The associated results in samples SB08_0-2, SB09_2-4, and SB12_0-2 are qualified as J or UJ because of potential indeterminate bias.

Metals by SW-846 Method 6010D

L2316548

The MB for batch WG1760842 exhibited a detection of selenium (0.154 mg/kg). The associated results in samples SB04_2-4, SB04_13-15, SB07_0-2, SB07_5-6.5, SB06_0-2, and SB06_12-14 are qualified as U at the reporting limit because of potential blank contamination.

The MS and/or MSD performed on sample SB06_0-2 exhibited percent recoveries outside of control limits for calcium (405%, 5%) and manganese (67%). The associated results in sample SB06_0-2 are qualified as J because of potential low or indeterminate bias.

The MS/MSD performed on sample SB06_0-2 exhibited RPDs above the control limit for calcium (83%). The associated results in sample SB06_0-2 are qualified as J because of potential indeterminate bias.

L2316797

The MB for batch WG1761364 exhibited detections of iron (2.11%), sodium (2.85%), and thallium (0.157%). The associated thallium results in samples SB02_9.75-11, SB03_A_2-4, and SB03_A_12-14 are qualified as U at the reporting limit because of potential blank contamination.

L2317033

The MS/MSD performed on sample SB01_0-2 exhibited a percent recovery below the LCL for manganese (48%, 72%). The associated results in samples SB01_0-2, SB01_9-11, SB05_6-8, SB05_8-10, and SODUP02_033123 are qualified as J because of potential low bias.

Cyanide by SW-846 Method 9012B

L2316797

The LCS for batch WG1762406 exhibited a percent recovery below the LCL for cyanide (79%). The associated results in sample SB02_9.75-11 are qualified as UJ because of potential low bias.

The LCS for batch WG1762751 exhibited a percent recovery below the LCL for cyanide (71%). The associated results in samples SB03_A_2-4 and SB03_A_12-14 are qualified as J or UJ because of potential low bias.

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L2317033

The LCS for batch WG1763456 exhibited a percent recovery below the LCL for cyanide (79%). The associated results in samples SB01_9-11 and SODUP02_033123 are qualified as J or UJ because of potential low bias.

The LCS for batch WG1763459 exhibited a percent recovery below the LCL for cyanide (79%). The associated results in samples SB01_0-2, SB05_6-8, and SB05_8-10 are qualified as UJ because of potential low bias.

Hexavalent Chromium by SW-846 Method 7196A

L2315966

The MB for batch WG1760922 exhibited a detection of hexavalent chromium (0.22 mg/kg). The associated detected results in samples SB10_12-13.5, SB10_2-4, SB11_12-14, SB11_2-4, and SODUP01_032723 are qualified as U at the reporting limit because of potential blank contamination.

The LCS for batch WG1760922 exhibited a percent recovery below the LCL for hexavalent chromium (70%). The associated results in samples SB10_12-13.5, SB10_2-4, SB11_12-14, SB11_2-4, and SODUP01_032723 are qualified as UJ because of potential low bias.

L2316244

The MB for batch WG1760922 exhibited a detection of hexavalent chromium (0.220 mg/kg). The associated detected results in samples SB08_0-2, SB08_12-14, SB09_12-13.5, SB09_2-4, and SB12_0-2 are qualified as U at the reporting limit because of potential blank contamination.

The LCS for batch WG1760922 exhibited a percent recovery below the LCL for hexavalent chromium (70%). The associated results in samples SB08_0-2, SB08_12-14, SB09_12-13.5, SB09_2-4, and SB12_0-2 are qualified as J or UJ because of potential low bias.

The LCS for batch WG1761993 exhibited a percent recovery below the LCL for hexavalent chromium (79%). The associated results in sample SB12_13.5-15 are qualified as UJ because of potential low bias.

The MS performed on sample SB12_13.5-15 exhibited a percent recovery below the LCL for hexavalent chromium (50%). The associated results in sample SB12_13.5-15 are qualified as UJ because of potential low bias.

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L2316548

The LCS for batch WG1762488 exhibited a percent recovery below the LCL for hexavalent chromium (75%). The associated results in samples SB04_2-4, SB04_13-15, SB07_0-2, SB07_5-6.5, SB06_0-2, and SB06_12-14 are qualified as UJ because of potential low bias.

L2316797

The LCS for batch WG1762784 exhibited a percent recovery below the LCL for hexavalent chromium (74%). The associated results in samples SB02_9.75-11, SB03_A_2-4, and SB03_A_12-14 are qualified as J because of potential low bias.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by SW-846 Method 8260D

L2316244

The MB for batch WG1761028-5 exhibited detections of 1,2,3-trichlorobenzene (0.33 ug/kg), and cymene (0.18 ug/kg). The associated results are non-detect. No qualification is necessary.

The MB for batch WG1762102-5 exhibited a detection of bromomethane (0.83 ug/kg). The associated results are non-detect. No qualification is necessary.

The MB for batch WG1762105-5 exhibited a detection of bromomethane (41 ug/kg). The associated results are non-detect. No qualification is necessary.

The LCS/LCSD for batch WG1761028 exhibited a percent recovery above the UCL for carbon disulfide (143%, 147%). The associated results are non-detect. No qualification is necessary.

The LCS/LCSD for batch WG1762105 exhibited percent recoveries above the UCL for carbon disulfide (171%, 167%) and 1,2,4,5-tetramethylbenzene (133%). The associated results are non-detect. No qualification is necessary.

L2316548

The MB for batch WG1762469 exhibited detections of 1,2,3-trichlorobenzene (16 ug/kg) and bromomethane (39 ug/kg). The associated results are non-detect. No qualification is necessary.

The MB for batch WG1762473 exhibited detections of 1,1,2,2-tetrachloroethane (0.23 ug/kg), 1,2,3-trichlorobenzene (1.2 ug/kg), 1,2,4-trichlorobenzene (0.96 ug/kg), 1,2-dichlorobenzene (0.3

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ug/kg), 1,3-dichlorobenzene (0.34 ug/kg), 1,4-dichlorobenzene (0.4 ug/kg), 1,4-diethyl benzene (0.35 ug/kg), 2-chlorotoluene (0.21 ug/kg), 4-chlorotoluene (0.23 ug/kg), bromobenzene (0.16 ug/kg), hexachlorobutadiene (0.35 ug/kg), n-butylbenzene (0.4 ug/kg), n-propylbenzene (0.19 ug/kg), sec-butylbenzene (0.25 ug/kg), styrene (0.44 ug/kg), and t-butylbenzene (0.15 ug/kg). The associated results are non-detect. No qualification is necessary.

The LCS/LCSD for batch WG1762469 exhibited a percent recovery above the UCL for carbon disulfide (141%, 139%). The associated results are non-detect. No qualification is necessary.

The LCS/LCSD for batch WG1762473 exhibited a percent recovery above the UCL for carbon disulfide (141%, 139%). The associated results are non-detect. No qualification is necessary.

The MS and/or MSD performed on sample SB06_0-2 exhibited a percent recovery below the LCL for vinyl acetate (68%). Organic results are not qualified on the basis of MS/MSD recoveries alone. No qualification is necessary.

The MS/MSD performed on sample SB06_0-2 exhibited a RPD above the control limit for hexachlorobutadiene (31 %). Organic results are not qualified on the basis of MS/MSD recoveries alone. No qualification is necessary.

The MS performed on sample SB06_0-2 exhibited a percent recovery below the LCL for 4-chloroaniline (33%). Organic results are not qualified on the basis of MS recoveries alone. No qualification is necessary.

L2316797

The MB for batch WG1762473 exhibited detections of 1,1,2,2-tetrachloroethane (0.23 ug/kg), 1,2,3-trichlorobenzene (1.2 ug/kg), 1,2,4,5-tetramethylbenzene (0.51 ug/kg), 1,2,4-trichlorobenzene (0.96 ug/kg), 1,2-dichlorobenzene (0.3 ug/kg), 1,3-dichlorobenzene (0.34 ug/kg), 1,4-dichlorobenzene (0.4 ug/kg), 1,4-diethyl benzene (0.35 ug/kg), 2-chlorotoluene (0.21 ug/kg), 4-chlorotoluene (0.23 ug/kg), bromobenzene (0.16 ug/kg), hexachlorobutadiene (0.35 ug/kg), n-propylbenzene (0.19 ug/kg), and styrene (0.44 ug/kg). The associated results are 10X the blank concentration or non-detect. No qualification is necessary.

L2317033

The MB for batch WG1763653 exhibited a detection of naphthalene (50 ug/kg). The associated results are >10X the contamination. No qualification is necessary.

The LCS/LCSD for batch WG1763945 exhibited a percent recovery above the UCL for vinyl chloride (138%, 131 %). The associated results are non-detect. No qualification is necessary.

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The MS/MSD performed on sample SB01_0-2 exhibited percent recoveries outside of control limits for numerous compounds (ranging from 31% - 141%) and RPDs outside of control limits (ranging from 33% - 77%). Organic results are not qualified on the basis of MS/MSD recoveries alone. No qualification is necessary.

SVOCs by SW-846 Method 8270E

L2316548

The MB for batch WG1762302-1 exhibited a detection of naphthalene (44 ug/kg). The associated results are >10X the contamination. No qualification is necessary.

The sample SB04_13-15 exhibited percent recoveries below the LCL for the surrogates 2,4,6-tribromophenol (0%), 2-fluorobiphenyl (0%), 2-fluorophenol (0%), p-terphenyl-d14 (0%), nitrobenzene-d5 (0%), and phenol-d6 (0%). The sample was diluted >10X. No qualification is necessary.

The LCS/LCSD for batch WG1761490 exhibited a percent recovery above the UCL for hexachlorocyclopentadiene (192%, 188%). The associated results are non-detect. No qualification is necessary.

The LCS/LCSD for batch WG1761490 exhibited a percent recovery above the UCL for pentachlorophenol (120%, 120%). The associated results are non-detect. No qualification is necessary.

The MS/MSD performed on sample SB06_0-2 exhibited a percent recovery above the UCL for pentachlorophenol (120%, 120%). Organic results are not qualified on the basis of MS/MSD recoveries alone. No qualification is necessary.

L2317033

The sample SB05_6-8 exhibited percent recoveries below the LCL for the surrogates 2,4,6-tribromophenol (0%), 2-fluorobiphenyl (0%), 2-fluorophenol (0%), p-terphenyl-d14 (0%), nitrobenzene-d5 (0%), and phenol-d6 (0%). The sample was diluted >10X. No qualification is necessary.

The MS or MSD performed on sample SB01_0-2 exhibited percent recoveries outside of control limits for pentachlorophenol (120%), phenol (97%), 1,4-dioxane (39%), and 4-chloroaniline (38%), and exhibited RPDs above the control limit for benzoic acid (65%) and bis(2-chloroethyl) ether (52%). Organic results are not qualified on the basis of MS recoveries alone. No qualification is necessary.

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PCBs by SW-846 Method 8082A

L2316548

The laboratory case narrative noted that sample SB06_12-14 exhibited a response above the UCL for the internal standard 1-bromo-2-nitrobenzene (column 2C) (247%). No associated results are reported from the corresponding column. No qualification is necessary.

The sample SB06_12-14 exhibited percent recoveries below the LCL for the surrogates tetrachloro-m-xylene (23%) and decachlorobiphenyl (PCB 209) (25%). No associated results are reported from the corresponding column. No qualification is necessary.

Metals by SW-846 Method 6010D

L2315966

The MB for batch WG1759741 exhibited detections of iron (0.442 mg/kg) and zinc (0.256 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

L2316244

The FB (SOFB01_032823) exhibited a detection of thallium (0.00019 mg/l). The associated results are >10X the contamination. No qualification is necessary.

The MB for batch WG1760336 exhibited a detection of iron (0.47 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

L2316548

The MB for batch WG1760842 exhibited detections of iron (0.578 mg/kg) and zinc (0.2 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

The MS and/or MSD performed on sample SB06_0-2 exhibited percent recoveries outside of control limits for aluminum (0%), iron (0%), potassium (42%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

The MS/MSD performed on sample SB06_0-2 exhibited a RPD above the control limit for magnesium (24%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

L2317033

The MB for batch WG1762100 exhibited detections of chromium (0.119 mg/kg) and iron (0.519 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

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The MS/MSD performed on sample SB01_0-2 exhibited percent recoveries below the LCL for aluminum (0%), calcium (0%), iron (0%), magnesium (0%), and potassium (46%, 60%) and an RPD above the UCL for calcium (39%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

FIELD DUPLICATE:

Two field duplicate and parent sample pairs were collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than $\pm 2X$ the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 50% for soil. The following field duplicate and parent sample pairs were compared to the precision criteria:

- SODUP01_032723 and SB10_2-4
- SODUP02_033123 and SB01_9-11

The field duplicate and parent sample (SODUP01_032723 and SB10_2-4) exhibited absolute differences above the RL for fluoranthene (700 ug/kg) and chlordane (alpha and gamma) (43.2 ug/kg). The associated results are qualified as J or UJ because of potential indeterminate bias.

The field duplicate and parent sample (SODUP02_033123 and SB01_9-11) exhibited RPDs above the control limit for aluminum (94.7%), benzo(b)fluoranthene (83.8%), calcium (67.4%), chromium, total (64.9%), chromium, trivalent (64.9%), copper (55.4%), magnesium (66.2%), naphthalene (111%), pyrene (89.4%), and vanadium (87%). The associated results are qualified as J because of potential indeterminate bias.

The field duplicate and parent sample (SODUP02_033123 and SB01_9-11) exhibited absolute differences above the RL for acenaphthene (470 ug/kg), acenaphthylene (560 ug/kg), benzo(a)anthracene (940 ug/kg), benzo(a)pyrene (1520 ug/kg), benzo(g,h,i)perylene (630 ug/kg), benzo(k)fluoranthene (420 ug/kg), chrysene (1090 ug/kg), fluoranthene (1120 ug/kg), fluorene (630 ug/kg), indeno(1,2,3-cd)pyrene (720 ug/kg), lead (14.3 mg/kg), phenanthrene (880 ug/kg), and potassium (755 mg/kg). The associated results are qualified as J because of potential indeterminate bias.

CONCLUSION:

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned

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above, that means that all specified criteria were met for that parameter. All of the data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:



Joe Conboy
Senior Staff Chemist

**Data Usability Summary Report
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Table 1: Sample Summary**

SDG	Lab Sample ID	Client Sample ID	Sample Date	Validation Level	Analytical Parameters
L2315966	L2315966-01	SB10_2-4	3/27/2023	Tier 1	SVOCs, Pesticides, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2315966	L2315966-02	SB10_12-13.5	3/27/2023	Tier 1	SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2315966	L2315966-03	SB11_2-4	3/27/2023	Tier 1	SVOCs, Pesticides, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2315966	L2315966-04	SB11_12-14	3/27/2023	Tier 1	Metals, Cyanide, Hexavalent & Trivalent Chromium
L2315966	L2315966-05	SODUP01_032723	3/27/2023	Tier 1	SVOCs, Pesticides, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-01	SB08_0-2	3/28/2023	Tier 1	VOCs, SVOCs, Pesticides, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-02	SB08_12-14	3/28/2023	Tier 1	SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-03	SB09_2-4	3/28/2023	Tier 1	SVOCs, Pesticides, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-04	SB09_12-13.5	3/28/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-05	SB12_0-2	3/28/2023	Tier 1	VOCs, SVOCs, Pesticides, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-06	SB12_13.5-15	3/28/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-07	SOFB01_032823	3/28/2023	Tier 1	VOCs, SVOCs, SVOC SIM, Pesticides, PCBs, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316244	L2316244-08	TB01_032823	3/28/2023	Tier 1	VOCs
L2316548	L2316548-01	SB04_2-4	3/29/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316548	L2316548-02	SB04_13-15	3/29/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316548	L2316548-05	SB07_0-2	3/29/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316548	L2316548-06	SB07_5-6.5	3/29/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316548	L2316548-07	SB06_0-2	3/29/2023	Tier 1	VOCs, SVOCs, PCBs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316548	L2316548-08	SB06_12-14	3/29/2023	Tier 1	VOCs, PCBs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316797	L2316797-01	SB02_9.75-11	3/30/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2316797	L2316797-02	SB03_A_2-4	3/30/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium

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Table 1: Sample Summary

SDG	Lab Sample ID	Client Sample ID	Sample Date	Validation Level	Analytical Parameters
L2316797	L2316797-03	SB03_A_12-14	3/30/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2317033	L2317033-01	SB05_6-8	3/31/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2317033	L2317033-02	SB05_8-10	3/31/2023	Tier 1	VOCs, SVOCs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2317033	L2317033-03	SB01_0-2	3/31/2023	Tier 1	VOCs, SVOCs, PCBs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2317033	L2317033-04	SB01_9-11	3/31/2023	Tier 1	VOCs, SVOCs, PCBs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2317033	L2317033-05	SB13_12-14	3/31/2023	Tier 1	VOCs, SVOCs
L2317033	L2317033-06	SODUP02_033123	3/31/2023	Tier 1	VOCs, SVOCs, PCBs, Metals, Cyanide, Hexavalent & Trivalent Chromium
L2317033	L2317033-07	TB02_033123	3/31/2023	Tier 1	VOCs
L2317033	L2317033-08	SOFB02_033123	3/31/2023	Tier 1	VOCs, SVOCs, SVOC SIM, Pesticides, PCBs, Herbicides, Metals, Cyanide, Hexavalent & Trivalent Chromium

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Table 2: Validator-Applied Qualification

SDG	Client Sample ID	Analysis	CAS #	Analyte	Validator Qualifier
L2315966	SB10_12-13.5	8270E	106-47-8	4-Chloroaniline	UJ
L2315966	SB10_2-4	8270E	106-47-8	4-Chloroaniline	UJ
L2315966	SB10_2-4	8270E	206-44-0	Fluoranthene	J
L2315966	SB11_12-14	8270E	106-47-8	4-Chloroaniline	UJ
L2315966	SB11_2-4	8270E	106-47-8	4-Chloroaniline	UJ
L2315966	SODUP01_032723	8270E	106-47-8	4-Chloroaniline	UJ
L2315966	SODUP01_032723	8270E	206-44-0	Fluoranthene	J
L2315966	SB10_12-13.5	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2315966	SB10_2-4	SW7196A	18540-29-9	Chromium, Hexavalent	U(0.897)
L2315966	SB11_12-14	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2315966	SB11_2-4	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2315966	SODUP01_032723	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2315966	SB10_2-4	SW8081B	50-29-3	4,4'-DDT	J
L2315966	SB10_2-4	SW8081B	5103-71-9	Alpha Chlordane	J
L2315966	SB10_2-4	SW8081B	57-74-9	Chlordane (alpha and gamma)	J
L2315966	SB10_2-4	SW8081B	1024-57-3	Heptachlor Epoxide	J
L2315966	SB11_2-4	SW8081B	50-29-3	4,4'-DDT	J
L2315966	SODUP01_032723	SW8081B	72-54-8	4,4'-DDD	J
L2315966	SODUP01_032723	SW8081B	72-55-9	4,4'-DDE	J
L2315966	SODUP01_032723	SW8081B	50-29-3	4,4'-DDT	J
L2315966	SODUP01_032723	SW8081B	5103-71-9	Alpha Chlordane	J
L2315966	SODUP01_032723	SW8081B	57-74-9	Chlordane (alpha and gamma)	UJ
L2315966	SODUP01_032723	SW8081B	1031-07-8	Endosulfan Sulfate	J
L2315966	SODUP01_032723	SW8081B	5103-74-2	Gamma Chlordane (Trans)	J
L2316244	SB08_0-2	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316244	SB08_12-14	SW7196A	18540-29-9	Chromium, Hexavalent	U (1.21)
L2316244	SB09_12-13.5	SW7196A	18540-29-9	Chromium, Hexavalent	U (1.07)
L2316244	SB09_2-4	SW7196A	18540-29-9	Chromium, Hexavalent	U (0.878)
L2316244	SB12_0-2	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316244	SB12_13.5-15	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316244	SB08_0-2	SW8081B	72-54-8	4,4'-DDD	UJ
L2316244	SB08_0-2	SW8081B	72-55-9	4,4'-DDE	J
L2316244	SB08_0-2	SW8081B	50-29-3	4,4'-DDT	UJ
L2316244	SB08_0-2	SW8081B	309-00-2	Aldrin	UJ
L2316244	SB08_0-2	SW8081B	319-84-6	Alpha BHC	UJ
L2316244	SB08_0-2	SW8081B	5103-71-9	Alpha Chlordane	UJ
L2316244	SB08_0-2	SW8081B	959-98-8	Alpha Endosulfan	UJ
L2316244	SB08_0-2	SW8081B	319-85-7	Beta BHC	UJ
L2316244	SB08_0-2	SW8081B	33213-65-9	Beta Endosulfan	UJ
L2316244	SB08_0-2	SW8081B	57-74-9	Chlordane (alpha and gamma)	UJ
L2316244	SB08_0-2	SW8081B	319-86-8	Delta BHC	UJ
L2316244	SB08_0-2	SW8081B	60-57-1	Dieldrin	UJ
L2316244	SB08_0-2	SW8081B	1031-07-8	Endosulfan Sulfate	UJ

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SDG	Client Sample ID	Analysis	CAS #	Analyte	Validator Qualifier
L2316244	SB08_0-2	SW8081B	72-20-8	Endrin	UJ
L2316244	SB08_0-2	SW8081B	7421-93-4	Endrin Aldehyde	UJ
L2316244	SB08_0-2	SW8081B	53494-70-5	Endrin Ketone	UJ
L2316244	SB08_0-2	SW8081B	58-89-9	Gamma BHC	UJ
L2316244	SB08_0-2	SW8081B	5103-74-2	Gamma Chlordane (Trans)	UJ
L2316244	SB08_0-2	SW8081B	76-44-8	Heptachlor	UJ
L2316244	SB08_0-2	SW8081B	1024-57-3	Heptachlor Epoxide	UJ
L2316244	SB08_0-2	SW8081B	72-43-5	Methoxychlor	UJ
L2316244	SB08_0-2	SW8081B	8001-35-2	Toxaphene	UJ
L2316244	SB09_2-4	SW8081B	72-54-8	4,4'-DDD	J
L2316244	SB09_2-4	SW8081B	72-55-9	4,4'-DDE	UJ
L2316244	SB09_2-4	SW8081B	50-29-3	4,4'-DDT	UJ
L2316244	SB09_2-4	SW8081B	309-00-2	Aldrin	UJ
L2316244	SB09_2-4	SW8081B	319-84-6	Alpha BHC	UJ
L2316244	SB09_2-4	SW8081B	5103-71-9	Alpha Chlordane	UJ
L2316244	SB09_2-4	SW8081B	959-98-8	Alpha Endosulfan	UJ
L2316244	SB09_2-4	SW8081B	319-85-7	Beta BHC	UJ
L2316244	SB09_2-4	SW8081B	33213-65-9	Beta Endosulfan	UJ
L2316244	SB09_2-4	SW8081B	57-74-9	Chlordane (alpha and gamma)	UJ
L2316244	SB09_2-4	SW8081B	319-86-8	Delta BHC	UJ
L2316244	SB09_2-4	SW8081B	60-57-1	Dieldrin	UJ
L2316244	SB09_2-4	SW8081B	1031-07-8	Endosulfan Sulfate	UJ
L2316244	SB09_2-4	SW8081B	72-20-8	Endrin	UJ
L2316244	SB09_2-4	SW8081B	7421-93-4	Endrin Aldehyde	UJ
L2316244	SB09_2-4	SW8081B	53494-70-5	Endrin Ketone	UJ
L2316244	SB09_2-4	SW8081B	58-89-9	Gamma BHC	UJ
L2316244	SB09_2-4	SW8081B	5103-74-2	Gamma Chlordane (Trans)	UJ
L2316244	SB09_2-4	SW8081B	76-44-8	Heptachlor	UJ
L2316244	SB09_2-4	SW8081B	1024-57-3	Heptachlor Epoxide	UJ
L2316244	SB09_2-4	SW8081B	72-43-5	Methoxychlor	UJ
L2316244	SB09_2-4	SW8081B	8001-35-2	Toxaphene	UJ
L2316244	SB12_0-2	SW8081B	72-54-8	4,4'-DDD	UJ
L2316244	SB12_0-2	SW8081B	72-55-9	4,4'-DDE	J
L2316244	SB12_0-2	SW8081B	50-29-3	4,4'-DDT	UJ
L2316244	SB12_0-2	SW8081B	309-00-2	Aldrin	UJ
L2316244	SB12_0-2	SW8081B	319-84-6	Alpha BHC	UJ
L2316244	SB12_0-2	SW8081B	5103-71-9	Alpha Chlordane	UJ
L2316244	SB12_0-2	SW8081B	959-98-8	Alpha Endosulfan	UJ
L2316244	SB12_0-2	SW8081B	319-85-7	Beta BHC	UJ
L2316244	SB12_0-2	SW8081B	33213-65-9	Beta Endosulfan	UJ
L2316244	SB12_0-2	SW8081B	57-74-9	Chlordane (alpha and gamma)	UJ
L2316244	SB12_0-2	SW8081B	319-86-8	Delta BHC	UJ
L2316244	SB12_0-2	SW8081B	60-57-1	Dieldrin	UJ

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SDG	Client Sample ID	Analysis	CAS #	Analyte	Validator Qualifier
L2316244	SB12_0-2	SW8081B	1031-07-8	Endosulfan Sulfate	UJ
L2316244	SB12_0-2	SW8081B	72-20-8	Endrin	UJ
L2316244	SB12_0-2	SW8081B	7421-93-4	Endrin Aldehyde	UJ
L2316244	SB12_0-2	SW8081B	53494-70-5	Endrin Ketone	UJ
L2316244	SB12_0-2	SW8081B	58-89-9	Gamma BHC	UJ
L2316244	SB12_0-2	SW8081B	5103-74-2	Gamma Chlordane (Trans)	UJ
L2316244	SB12_0-2	SW8081B	76-44-8	Heptachlor	UJ
L2316244	SB12_0-2	SW8081B	1024-57-3	Heptachlor Epoxide	UJ
L2316244	SB12_0-2	SW8081B	72-43-5	Methoxychlor	UJ
L2316244	SB12_0-2	SW8081B	8001-35-2	Toxaphene	UJ
L2316244	SB09_12-13.5	SW8260D	87-61-6	1,2,3-Trichlorobenzene	UJ
L2316244	SB09_12-13.5	SW8260D	95-93-2	1,2,4,5-Tetramethylbenzene	UJ
L2316244	SB09_12-13.5	SW8260D	95-63-6	1,2,4-Trimethylbenzene	J
L2316244	SB09_12-13.5	SW8260D	96-12-8	1,2-Dibromo-3-Chloropropane	UJ
L2316244	SB09_12-13.5	SW8260D	622-96-8	4-Ethyltoluene	J
L2316244	SB09_12-13.5	SW8260D	67-64-1	Acetone	J
L2316244	SB09_12-13.5	SW8260D	71-43-2	Benzene	J
L2316244	SB09_12-13.5	SW8260D	75-15-0	Carbon Disulfide	J
L2316244	SB09_12-13.5	SW8260D	99-87-6	Cymene	J
L2316244	SB09_12-13.5	SW8260D	100-41-4	Ethylbenzene	J
L2316244	SB09_12-13.5	SW8260D	98-82-8	Isopropylbenzene	J
L2316244	SB09_12-13.5	SW8260D	179601-23-1	M,P-Xylene	J
L2316244	SB09_12-13.5	SW8260D	91-20-3	Naphthalene	J
L2316244	SB09_12-13.5	SW8260D	104-51-8	n-Butylbenzene	J
L2316244	SB09_12-13.5	SW8260D	103-65-1	n-Propylbenzene	J
L2316244	SB09_12-13.5	SW8260D	95-47-6	o-Xylene	J
L2316244	SB09_12-13.5	SW8260D	135-98-8	Sec-Butylbenzene	J
L2316244	SB09_12-13.5	SW8260D	98-06-6	T-Butylbenzene	J
L2316244	SB09_12-13.5	SW8260D	108-88-3	Toluene	J
L2316244	SB09_12-13.5	SW8260D	1330-20-7	Total Xylenes	J
L2316244	SB12_0-2	SW8260D	87-61-6	1,2,3-Trichlorobenzene	UJ
L2316244	SB12_0-2	SW8260D	95-93-2	1,2,4,5-Tetramethylbenzene	UJ
L2316244	SB12_0-2	SW8260D	96-12-8	1,2-Dibromo-3-Chloropropane	UJ
L2316244	SB12_0-2	SW8260D	67-64-1	Acetone	J
L2316244	SB12_0-2	SW8260D	91-20-3	Naphthalene	UJ
L2316244	SB12_13.5-15	SW8260D	87-61-6	1,2,3-Trichlorobenzene	UJ
L2316244	SB12_13.5-15	SW8260D	95-93-2	1,2,4,5-Tetramethylbenzene	J
L2316244	SB12_13.5-15	SW8260D	96-12-8	1,2-Dibromo-3-Chloropropane	UJ
L2316244	SB12_13.5-15	SW8260D	91-20-3	Naphthalene	J
L2316548	SB04_13-15	6010D	7782-49-2	Selenium	U(1.94)
L2316548	SB04_2-4	6010D	7782-49-2	Selenium	U(1.90)
L2316548	SB06_0-2	6010D	7440-70-2	Calcium	J
L2316548	SB06_0-2	6010D	7439-96-5	Manganese	J

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L2316548	SB06_0-2	6010D	7782-49-2	Selenium	U(1.64)
L2316548	SB06_12-14	6010D	7782-49-2	Selenium	U(2.03)
L2316548	SB07_0-2	6010D	7782-49-2	Selenium	U(1.72)
L2316548	SB07_5-6.5	6010D	7782-49-2	Selenium	U(1.94)
L2316548	SB04_13-15	8270E	106-47-8	4-Chloroaniline	UJ
L2316548	SB04_2-4	8270E	123-91-1	1,4-Dioxane	UJ
L2316548	SB06_0-2	8270E	106-47-8	4-Chloroaniline	UJ
L2316548	SB06_12-14	8270E	106-47-8	4-Chloroaniline	UJ
L2316548	SB07_0-2	8270E	108-95-2	Phenol	UJ
L2316548	SB07_5-6.5	8270E	106-47-8	4-Chloroaniline	UJ
L2316548	SB04_13-15	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	SB04_2-4	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	SB06_0-2	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	SB06_12-14	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	SB07_0-2	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	SB07_5-6.5	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	WG1762488-1	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	WG1762488-7	SW7196A	18540-29-9	Chromium, Hexavalent	UJ
L2316548	SB04_2-4	SW8260D	95-93-2	1,2,4,5-Tetramethylbenzene	U(3.2)
L2316548	SB04_2-4	SW8260D	120-82-1	1,2,4-Trichlorobenzene	UJ
L2316548	SB04_2-4	SW8260D	99-87-6	Cymene	U(1.6)
L2316548	SB04_2-4	SW8260D	87-68-3	Hexachlorobutadiene	UJ
L2316548	SB04_2-4	SW8260D	91-20-3	Naphthalene	J
L2316548	SB06_0-2	SW8260D	120-82-1	1,2,4-Trichlorobenzene	UJ
L2316548	SB06_0-2	SW8260D	87-68-3	Hexachlorobutadiene	UJ
L2316548	SB06_12-14	SW8260D	120-82-1	1,2,4-Trichlorobenzene	UJ
L2316548	SB06_12-14	SW8260D	87-68-3	Hexachlorobutadiene	UJ
L2316548	SB07_0-2	SW8260D	120-82-1	1,2,4-Trichlorobenzene	UJ
L2316548	SB07_0-2	SW8260D	87-68-3	Hexachlorobutadiene	UJ
L2316797	SB03_A_2-4	6010D	7440-28-0	Thallium	U(1.96)
L2316797	SB03_A_2-4	8270E	95-95-4	2,4,5-Trichlorophenol	UJ
L2316797	SB03_A_2-4	8270E	88-06-2	2,4,6-Trichlorophenol	UJ
L2316797	SB03_A_2-4	8270E	120-83-2	2,4-Dichlorophenol	UJ
L2316797	SB03_A_2-4	8270E	105-67-9	2,4-Dimethylphenol	UJ
L2316797	SB03_A_2-4	8270E	51-28-5	2,4-Dinitrophenol	UJ
L2316797	SB03_A_2-4	8270E	121-14-2	2,4-Dinitrotoluene	UJ
L2316797	SB03_A_2-4	8270E	606-20-2	2,6-Dinitrotoluene	UJ
L2316797	SB03_A_2-4	8270E	95-57-8	2-Chlorophenol	UJ
L2316797	SB03_A_2-4	8270E	95-48-7	2-Methylphenol	UJ
L2316797	SB03_A_2-4	8270E	88-75-5	2-Nitrophenol	UJ
L2316797	SB03_A_2-4	8270E	65794-96-9	3 & 4 Methylphenol	UJ
L2316797	SB03_A_2-4	8270E	534-52-1	4,6-Dinitro-2-Methylphenol	UJ
L2316797	SB03_A_2-4	8270E	59-50-7	4-Chloro-3-Methylphenol	UJ

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L2316797	SB03_A_2-4	8270E	100-02-7	4-Nitrophenol	UJ
L2316797	SB03_A_2-4	8270E	65-85-0	Benzoic Acid	UJ
L2316797	SB03_A_2-4	8270E	100-51-6	Benzyl Alcohol	UJ
L2316797	SB03_A_2-4	8270E	87-86-5	Pentachlorophenol	UJ
L2316797	SB03_A_2-4	8270E	108-95-2	Phenol	J
L2316797	SB02_9.75-11	SW7196A	18540-29-9	Chromium, Hexavalent	J
L2316797	SB03_A_12-14	SW7196A	18540-29-9	Chromium, Hexavalent	J
L2316797	SB03_A_2-4	SW7196A	18540-29-9	Chromium, Hexavalent	J
L2316797	SB02_9.75-11	SW8260D	100-42-5	Styrene	U(2900)
L2316797	SB02_9.75-11	SW8260D	110-57-6	Trans-1,4-Dichloro-2-Butene	UJ
L2316797	SB03_A_12-14	SW8260D	120-82-1	1,2,4-Trichlorobenzene	UJ
L2316797	SB03_A_12-14	SW8260D	75-15-0	Carbon Disulfide	J
L2316797	SB03_A_12-14	SW8260D	99-87-6	Cymene	U(1.3)
L2316797	SB03_A_12-14	SW8260D	87-68-3	Hexachlorobutadiene	UJ
L2316797	SB03_A_12-14	SW8260D	91-20-3	Naphthalene	J
L2316797	SB03_A_12-14	SW8260D	104-51-8	n-Butylbenzene	J
L2316797	SB03_A_12-14	SW8260D	98-06-6	T-Butylbenzene	U(2.6)
L2316797	WG1762473-5	SW8260D	135-98-8	Sec-Butylbenzene	J
L2316797	SB02_9.75-11	SW9012B	57-12-5	Cyanide	UJ
L2316797	SB03_A_12-14	SW9012B	57-12-5	Cyanide	UJ
L2316797	SB03_A_2-4	SW9012B	57-12-5	Cyanide	J
L2317033	SB01_0-2	6010D	7439-96-5	Manganese	J
L2317033	SB01_9-11	6010D	7429-90-5	Aluminum	J
L2317033	SB01_9-11	6010D	7440-70-2	Calcium	J
L2317033	SB01_9-11	6010D	7440-47-3	Chromium, Total	J
L2317033	SB01_9-11	6010D	7440-50-8	Copper	J
L2317033	SB01_9-11	6010D	7439-92-1	Lead	J
L2317033	SB01_9-11	6010D	7439-95-4	Magnesium	J
L2317033	SB01_9-11	6010D	7439-96-5	Manganese	J
L2317033	SB01_9-11	6010D	7440-09-7	Potassium	J
L2317033	SB01_9-11	6010D	7440-62-2	Vanadium	J
L2317033	SB05_6-8	6010D	7439-96-5	Manganese	J
L2317033	SB05_8-10	6010D	7439-96-5	Manganese	J
L2317033	SODUP02_033123	6010D	7429-90-5	Aluminum	J
L2317033	SODUP02_033123	6010D	7440-70-2	Calcium	J
L2317033	SODUP02_033123	6010D	7440-47-3	Chromium, Total	J
L2317033	SODUP02_033123	6010D	7440-50-8	Copper	J
L2317033	SODUP02_033123	6010D	7439-92-1	Lead	J
L2317033	SODUP02_033123	6010D	7439-95-4	Magnesium	J
L2317033	SODUP02_033123	6010D	7439-96-5	Manganese	J
L2317033	SODUP02_033123	6010D	7440-09-7	Potassium	J
L2317033	SODUP02_033123	6010D	7440-62-2	Vanadium	J
L2317033	SB01_0-2	8270E	123-91-1	1,4-Dioxane	UJ

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L2317033	SB01_0-2	8270E	91-20-3	Naphthalene	U(180)
L2317033	SB01_9-11	8270E	123-91-1	1,4-Dioxane (P-Dioxane)	UJ
L2317033	SB01_9-11	8270E	83-32-9	Acenaphthene	J
L2317033	SB01_9-11	8270E	208-96-8	Acenaphthylene	J
L2317033	SB01_9-11	8270E	56-55-3	Benzo(a)anthracene	J
L2317033	SB01_9-11	8270E	50-32-8	Benzo(a)pyrene	J
L2317033	SB01_9-11	8270E	205-99-2	Benzo(b)fluoranthene	J
L2317033	SB01_9-11	8270E	191-24-2	Benzo(g,h,i)Perylene	J
L2317033	SB01_9-11	8270E	207-08-9	Benzo(k)fluoranthene	J
L2317033	SB01_9-11	8270E	218-01-9	Chrysene	J
L2317033	SB01_9-11	8270E	206-44-0	Fluoranthene	J
L2317033	SB01_9-11	8270E	86-73-7	Fluorene	J
L2317033	SB01_9-11	8270E	193-39-5	Indeno(1,2,3-cd)pyrene	J
L2317033	SB01_9-11	8270E	91-20-3	Naphthalene	J
L2317033	SB01_9-11	8270E	85-01-8	Phenanthrene	J
L2317033	SB01_9-11	8270E	129-00-0	Pyrene	J
L2317033	SB05_6-8	8270E	123-91-1	1,4-Dioxane	UJ
L2317033	SB05_8-10	8270E	123-91-1	1,4-Dioxane	UJ
L2317033	SB13_12-14	8270E	123-91-1	1,4-Dioxane	UJ
L2317033	SB13_12-14	8270E	91-20-3	Naphthalene	J
L2317033	SODUP02_033123	8270E	123-91-1	1,4-Dioxane	UJ
L2317033	SODUP02_033123	8270E	83-32-9	Acenaphthene	J
L2317033	SODUP02_033123	8270E	208-96-8	Acenaphthylene	J
L2317033	SODUP02_033123	8270E	56-55-3	Benzo(a)anthracene	J
L2317033	SODUP02_033123	8270E	50-32-8	Benzo(a)pyrene	J
L2317033	SODUP02_033123	8270E	205-99-2	Benzo(b)fluoranthene	J
L2317033	SODUP02_033123	8270E	191-24-2	Benzo(g,h,i)Perylene	J
L2317033	SODUP02_033123	8270E	207-08-9	Benzo(k)fluoranthene	J
L2317033	SODUP02_033123	8270E	218-01-9	Chrysene	J
L2317033	SODUP02_033123	8270E	206-44-0	Fluoranthene	J
L2317033	SODUP02_033123	8270E	86-73-7	Fluorene	J
L2317033	SODUP02_033123	8270E	193-39-5	Indeno(1,2,3-cd)pyrene	J
L2317033	SODUP02_033123	8270E	91-20-3	Naphthalene	J
L2317033	SODUP02_033123	8270E	85-01-8	Phenanthrene	J
L2317033	SODUP02_033123	8270E	129-00-0	Pyrene	J
L2317033	SB01_9-11	CALC	16065-83-1	Chromium, Trivalent	J
L2317033	SODUP02_033123	CALC	16065-83-1	Chromium, Trivalent	J
L2317033	SB01_0-2	SW8260D	91-20-3	Naphthalene	U(4.6)
L2317033	SB01_9-11	SW8260D	91-20-3	Naphthalene	J
L2317033	SB01_9-11	SW8260D	110-57-6	Trans-1,4-Dichloro-2-Butene	UJ
L2317033	SB05_6-8	SW8260D	95-93-2	1,2,4,5-Tetramethylbenzene	J
L2317033	SB05_6-8	SW8260D	71-43-2	Benzene	J
L2317033	SB05_6-8	SW8260D	99-87-6	Cymene	J

**Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Samples
Table 2: Validator-Applied Qualification**

SDG	Client Sample ID	Analysis	CAS #	Analyte	Validator Qualifier
L2317033	SB05_6-8	SW8260D	104-51-8	n-Butylbenzene	J
L2317033	SB05_6-8	SW8260D	135-98-8	Sec-Butylbenzene	J
L2317033	SB05_8-10	SW8260D	95-93-2	1,2,4,5-Tetramethylbenzene	J
L2317033	SB05_8-10	SW8260D	95-63-6	1,2,4-Trimethylbenzene	J
L2317033	SB05_8-10	SW8260D	108-67-8	1,3,5-Trimethylbenzene	J
L2317033	SB05_8-10	SW8260D	105-05-5	1,4-Diethyl Benzene	J
L2317033	SB05_8-10	SW8260D	622-96-8	4-Ethyltoluene	J
L2317033	SB05_8-10	SW8260D	71-43-2	Benzene	J
L2317033	SB05_8-10	SW8260D	99-87-6	Cymene	J
L2317033	SB05_8-10	SW8260D	100-41-4	Ethylbenzene	J
L2317033	SB05_8-10	SW8260D	98-82-8	Isopropylbenzene	J
L2317033	SB05_8-10	SW8260D	179601-23-1	M,P-Xylene	J
L2317033	SB05_8-10	SW8260D	91-20-3	Naphthalene	J
L2317033	SB05_8-10	SW8260D	104-51-8	n-Butylbenzene	J
L2317033	SB05_8-10	SW8260D	103-65-1	n-Propylbenzene	J
L2317033	SB05_8-10	SW8260D	95-47-6	o-Xylene	J
L2317033	SB05_8-10	SW8260D	135-98-8	Sec-Butylbenzene	J
L2317033	SB05_8-10	SW8260D	100-42-5	Styrene	J
L2317033	SB05_8-10	SW8260D	108-88-3	Toluene	J
L2317033	SB05_8-10	SW8260D	1330-20-7	Total Xylenes	J
L2317033	SB05_8-10	SW8260D	79-01-6	Trichloroethene	J
L2317033	SB13_12-14	SW8260D	100-41-4	Ethylbenzene	J
L2317033	SB13_12-14	SW8260D	91-20-3	Naphthalene	J
L2317033	SB13_12-14	SW8260D	110-57-6	Trans-1,4-Dichloro-2-Butene	UJ
L2317033	SB01_0-2	SW9012B	57-12-5	Cyanide	UJ
L2317033	SB01_9-11	SW9012B	57-12-5	Cyanide	UJ
L2317033	SB05_6-8	SW9012B	57-12-5	Cyanide	UJ
L2317033	SB05_8-10	SW9012B	57-12-5	Cyanide	UJ
L2317033	SODUP02_033123	SW9012B	57-12-5	Cyanide	J

JOSEPH CONBOY

SENIOR STAFF CHEMIST

ENVIRONMENTAL

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1910.120(e)(4)
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NJ Analytical Guidance
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Training

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Environmental Database
Training

LANGAN

JOSEPH CONBOY

guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, VOCs by USEPA TO-15, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
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**Project completed prior to employment at LANGAN.*

1 University Square Drive Princeton, NJ 08540 T: 609.282.8000
Mailing Address: 1 University Square Drive Princeton, NJ 08540

To: Elizabeth Adkins, Langan Project Engineer

From: Joe Conboy, Langan Senior Staff Chemist

Date: April 19, 2023

Re: Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Vapor and Ambient Air Samples
Langan Project No.: 170697301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of air samples collected in March 2023 Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C (Langan) at the 2731 West 12th Street site. The samples were analyzed by Alpha Analytical Laboratories, Inc. (New York State Department of Health [NYSDOH] Environmental Laboratory Approval Program [ELAP] registration # 11148) for volatile organic compounds (VOC) by the methods specified below.

- VOCs by United States Environmental Protection Agency (USEPA) Method TO-15

Table 1, attached, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

Validation Overview

This data validation was performed in accordance with the following guidelines, where applicable:

- USEPA Region II Standard Operating Procedure (SOP) #HW-31, "Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15" (September 2016, Revision 6),
- USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA 540- R-20-005, November 2020), and
- published analytical methodologies.

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator.

Tier 1 data validation is based on completeness and compliance checks of sample-related QC results including: sample receipt documentation; analytical holding times; sample preservation;

Technical Memorandum

Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Vapor and Ambient Air Samples
Langan Project No.: 170697301
April 19, 2023 Page 2 of 3

blank results (method, field, and trip); surrogate recoveries; MS/MSD recoveries and RPDs values; field duplicate RPDs, laboratory duplicate RPDs, and LCS/LCSD recoveries and RPDs. SDG L2316799 underwent Tier 1 validation review.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- R** – The sample results are unusable because certain criteria were not met when generating the data. The analyte may or may not be present in the sample.
- J** – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ** – The analyte was not detected at a level greater than or equal to the reporting limit; however, the reported reporting limit is approximate and may be inaccurate or imprecise.
- U** – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- NJ** – The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are considered invalid and are not technically usable for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified in Table 2 (attached).

The following acronyms may be used in the discussion of data-quality issues:

%D	Percent Difference	MB	Method Blank
CCV	Continuing Calibration Verification	MDL	Method Detection Limit
FB	Field Blank	MS	Matrix Spike
FD	Field Duplicate	MSD	Matrix Spike Duplicate
ICAL	Initial Calibration	RF	Response Factor
ICV	Initial Calibration Verification	RL	Reporting Limit
ISTD	Internal Standard	RPD	Relative Percent Difference
LCL	Lower Control Limit	RSD	Relative Standard Deviation
LCS	Laboratory Control Sample	TB	Trip Blank
LCSD	Laboratory Control Sample Duplicate	UCL	Upper Control Limit

Technical Memorandum

Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Vapor and Ambient Air Samples
Langan Project No.: 170697301
April 19, 2023 Page 3 of 3

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. No minor deficiencies were identified.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by USEPA Method TO-15:

L2316799

The LCS for batch WG1763188 exhibited percent recoveries above the UCL for bromoform (146%), carbon tetrachloride (135%), and dibromochloromethane (136%). The associated results are non-detect. No qualification is necessary.

CONCLUSION:

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:



Joe Conboy
Senior Staff Chemist

Data Usability Summary Report
For 2731 West 12th Street
March 2023 Soil Vapor and Ambient Air Samples
Table 1: Sample Summary

SDG	Lab Sample ID	Client Sample ID	Sample Date	Validation Level	Analytical Parameters
L2316799	L2316799-01	SV01_033023	3/30/2023	Tier 1	VOCs by TO-15
L2316799	L2316799-02	SV02_033023	3/30/2023	Tier 1	VOCs by TO-15
L2316799	L2316799-03	SV03_033023	3/30/2023	Tier 1	VOCs by TO-15
L2316799	L2316799-04	SV04_033023	3/30/2023	Tier 1	VOCs by TO-15
L2316799	L2316799-05	AA01_033023	3/30/2023	Tier 1	VOCs by TO-15

JOSEPH CONBOY

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**Project completed prior to employment at LANGAN.*

APPENDIX E

LABORATORY ANALYTICAL REPORTS – SOIL



ANALYTICAL REPORT

Lab Number:	L2315966
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Elizabeth Adkins
Phone:	(212) 479-5400
Project Name:	2731 W 12TH STREET
Project Number:	170697301
Report Date:	04/03/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2315966-01	SB10_2-4	SOIL	BROOKLYN, NY	03/27/23 15:50	03/27/23
L2315966-02	SB10_12-13.5	SOIL	BROOKLYN, NY	03/27/23 15:55	03/27/23
L2315966-03	SB11_2-4	SOIL	BROOKLYN, NY	03/27/23 14:00	03/27/23
L2315966-04	SB11_12-14	SOIL	BROOKLYN, NY	03/27/23 14:15	03/27/23
L2315966-05	SODUP01_032723	SOIL	BROOKLYN, NY	03/27/23 00:00	03/27/23

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Semivolatile Organics

L2315966-01 and -05: The sample has elevated detection limits due to limited sample volume available for analysis.

Total Metals

L2315966-01 through -05: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

Hexavalent Chromium

The WG1760922-2 LCS recovery for chromium, hexavalent (70%), associated with L2315966-01 through -05, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Kelly O'Neill

Title: Technical Director/Representative

Date: 04/03/23

ORGANICS

SEMIVOLATILES

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-01
Client ID: SB10_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:50
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 02:14
Analyst: LJG
Percent Solids: 89%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	95	J	ug/kg	420	54.	1
1,2,4-Trichlorobenzene	ND		ug/kg	530	60.	1
Hexachlorobenzene	ND		ug/kg	320	59.	1
Bis(2-chloroethyl)ether	ND		ug/kg	470	71.	1
2-Chloronaphthalene	ND		ug/kg	530	52.	1
1,2-Dichlorobenzene	ND		ug/kg	530	95.	1
1,3-Dichlorobenzene	ND		ug/kg	530	91.	1
1,4-Dichlorobenzene	ND		ug/kg	530	92.	1
3,3'-Dichlorobenzidine	ND		ug/kg	530	140	1
2,4-Dinitrotoluene	ND		ug/kg	530	100	1
2,6-Dinitrotoluene	ND		ug/kg	530	90.	1
Fluoranthene	1500		ug/kg	320	60.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	530	56.	1
4-Bromophenyl phenyl ether	ND		ug/kg	530	80.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	630	90.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	570	53.	1
Hexachlorobutadiene	ND		ug/kg	530	77.	1
Hexachlorocyclopentadiene	ND		ug/kg	1500	480	1
Hexachloroethane	ND		ug/kg	420	85.	1
Isophorone	ND		ug/kg	470	68.	1
Naphthalene	ND		ug/kg	530	64.	1
Nitrobenzene	ND		ug/kg	470	78.	1
NDPA/DPA	ND		ug/kg	420	60.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	530	81.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	530	180	1
Butyl benzyl phthalate	ND		ug/kg	530	130	1
Di-n-butylphthalate	ND		ug/kg	530	100	1
Di-n-octylphthalate	ND		ug/kg	530	180	1



Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS****Lab ID:** L2315966-01**Date Collected:** 03/27/23 15:50**Client ID:** SB10_2-4**Date Received:** 03/27/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	530	49.	1
Dimethyl phthalate	ND		ug/kg	530	110	1
Benzo(a)anthracene	700		ug/kg	320	59.	1
Benzo(a)pyrene	770		ug/kg	420	130	1
Benzo(b)fluoranthene	800		ug/kg	320	89.	1
Benzo(k)fluoranthene	390		ug/kg	320	84.	1
Chrysene	680		ug/kg	320	55.	1
Acenaphthylene	ND		ug/kg	420	81.	1
Anthracene	260	J	ug/kg	320	100	1
Benzo(ghi)perylene	420		ug/kg	420	62.	1
Fluorene	110	J	ug/kg	530	51.	1
Phenanthrene	910		ug/kg	320	64.	1
Dibenzo(a,h)anthracene	95	J	ug/kg	320	61.	1
Indeno(1,2,3-cd)pyrene	420		ug/kg	420	73.	1
Pyrene	1300		ug/kg	320	52.	1
Biphenyl	ND		ug/kg	1200	68.	1
4-Chloroaniline	ND		ug/kg	530	96.	1
2-Nitroaniline	ND		ug/kg	530	100	1
3-Nitroaniline	ND		ug/kg	530	99.	1
4-Nitroaniline	ND		ug/kg	530	220	1
Dibenzofuran	ND		ug/kg	530	50.	1
2-Methylnaphthalene	ND		ug/kg	630	64.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	530	55.	1
Acetophenone	ND		ug/kg	530	65.	1
2,4,6-Trichlorophenol	ND		ug/kg	320	100	1
p-Chloro-m-cresol	ND		ug/kg	530	78.	1
2-Chlorophenol	ND		ug/kg	530	62.	1
2,4-Dichlorophenol	ND		ug/kg	470	85.	1
2,4-Dimethylphenol	ND		ug/kg	530	170	1
2-Nitrophenol	ND		ug/kg	1100	200	1
4-Nitrophenol	ND		ug/kg	740	210	1
2,4-Dinitrophenol	ND		ug/kg	2500	240	1
4,6-Dinitro-o-cresol	ND		ug/kg	1400	250	1
Pentachlorophenol	ND		ug/kg	420	120	1
Phenol	ND		ug/kg	530	80.	1
2-Methylphenol	ND		ug/kg	530	82.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	760	82.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-01
Client ID: SB10_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:50
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	530	100	1
Benzoic Acid	ND		ug/kg	1700	530	1
Benzyl Alcohol	ND		ug/kg	530	160	1
Carbazole	110	J	ug/kg	530	51.	1
1,4-Dioxane	ND		ug/kg	79	24.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	49		25-120
Phenol-d6	47		10-120
Nitrobenzene-d5	47		23-120
2-Fluorobiphenyl	50		30-120
2,4,6-Tribromophenol	55		10-136
4-Terphenyl-d14	53		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-02
Client ID: SB10_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:55
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 04/01/23 02:58
Analyst: CMM
Percent Solids: 80%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	160	21.	1
1,2,4-Trichlorobenzene	ND		ug/kg	210	24.	1
Hexachlorobenzene	ND		ug/kg	120	23.	1
Bis(2-chloroethyl)ether	ND		ug/kg	190	28.	1
2-Chloronaphthalene	ND		ug/kg	210	20.	1
1,2-Dichlorobenzene	ND		ug/kg	210	37.	1
1,3-Dichlorobenzene	ND		ug/kg	210	36.	1
1,4-Dichlorobenzene	220		ug/kg	210	36.	1
3,3'-Dichlorobenzidine	ND		ug/kg	210	55.	1
2,4-Dinitrotoluene	ND		ug/kg	210	41.	1
2,6-Dinitrotoluene	ND		ug/kg	210	35.	1
Fluoranthene	130		ug/kg	120	24.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	210	22.	1
4-Bromophenyl phenyl ether	ND		ug/kg	210	32.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	250	35.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	220	21.	1
Hexachlorobutadiene	ND		ug/kg	210	30.	1
Hexachlorocyclopentadiene	ND		ug/kg	590	190	1
Hexachloroethane	ND		ug/kg	160	33.	1
Isophorone	ND		ug/kg	190	27.	1
Naphthalene	69	J	ug/kg	210	25.	1
Nitrobenzene	ND		ug/kg	190	31.	1
NDPA/DPA	ND		ug/kg	160	24.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	210	32.	1
Bis(2-ethylhexyl)phthalate	950		ug/kg	210	72.	1
Butyl benzyl phthalate	62000	E	ug/kg	210	52.	1
Di-n-butylphthalate	78	J	ug/kg	210	39.	1
Di-n-octylphthalate	73	J	ug/kg	210	70.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-02
 Client ID: SB10_12-13.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:55
 Date Received: 03/27/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	210	19.	1
Dimethyl phthalate	ND		ug/kg	210	43.	1
Benzo(a)anthracene	140		ug/kg	120	23.	1
Benzo(a)pyrene	110	J	ug/kg	160	50.	1
Benzo(b)fluoranthene	80	J	ug/kg	120	35.	1
Benzo(k)fluoranthene	ND		ug/kg	120	33.	1
Chrysene	210		ug/kg	120	22.	1
Acenaphthylene	ND		ug/kg	160	32.	1
Anthracene	110	J	ug/kg	120	40.	1
Benzo(ghi)perylene	100	J	ug/kg	160	24.	1
Fluorene	ND		ug/kg	210	20.	1
Phenanthrene	72	J	ug/kg	120	25.	1
Dibenzo(a,h)anthracene	ND		ug/kg	120	24.	1
Indeno(1,2,3-cd)pyrene	51	J	ug/kg	160	29.	1
Pyrene	480		ug/kg	120	20.	1
Biphenyl	ND		ug/kg	470	27.	1
4-Chloroaniline	ND		ug/kg	210	38.	1
2-Nitroaniline	ND		ug/kg	210	40.	1
3-Nitroaniline	ND		ug/kg	210	39.	1
4-Nitroaniline	ND		ug/kg	210	86.	1
Dibenzofuran	ND		ug/kg	210	20.	1
2-Methylnaphthalene	71	J	ug/kg	250	25.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	210	22.	1
Acetophenone	30	J	ug/kg	210	26.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	39.	1
p-Chloro-m-cresol	ND		ug/kg	210	31.	1
2-Chlorophenol	ND		ug/kg	210	24.	1
2,4-Dichlorophenol	ND		ug/kg	190	33.	1
2,4-Dimethylphenol	ND		ug/kg	210	68.	1
2-Nitrophenol	ND		ug/kg	450	78.	1
4-Nitrophenol	ND		ug/kg	290	84.	1
2,4-Dinitrophenol	ND		ug/kg	990	96.	1
4,6-Dinitro-o-cresol	ND		ug/kg	540	99.	1
Pentachlorophenol	ND		ug/kg	160	46.	1
Phenol	ND		ug/kg	210	31.	1
2-Methylphenol	ND		ug/kg	210	32.	1
3-Methylphenol/4-Methylphenol	40	J	ug/kg	300	32.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-02
Client ID: SB10_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:55
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	210	40.	1
Benzoic Acid	ND		ug/kg	670	210	1
Benzyl Alcohol	200	J	ug/kg	210	63.	1
Carbazole	ND		ug/kg	210	20.	1
1,4-Dioxane	ND		ug/kg	31	9.5	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	30		25-120
Phenol-d6	59		10-120
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	56		30-120
2,4,6-Tribromophenol	14		10-136
4-Terphenyl-d14	44		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-02 D
 Client ID: SB10_12-13.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:55
 Date Received: 03/27/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/02/23 17:13
 Analyst: CMM
 Percent Solids: 80%

Extraction Method: EPA 3546
 Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Butyl benzyl phthalate	96000		ug/kg	4100	1000	20
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Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-03
Client ID: SB11_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 03:03
Analyst: LJG
Percent Solids: 92%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	140	18.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	20.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	24.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
1,2-Dichlorobenzene	ND		ug/kg	180	32.	1
1,3-Dichlorobenzene	ND		ug/kg	180	30.	1
1,4-Dichlorobenzene	ND		ug/kg	180	31.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	47.	1
2,4-Dinitrotoluene	ND		ug/kg	180	35.	1
2,6-Dinitrotoluene	ND		ug/kg	180	30.	1
Fluoranthene	160		ug/kg	110	20.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	27.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	210	30.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	190	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	500	160	1
Hexachloroethane	ND		ug/kg	140	28.	1
Isophorone	ND		ug/kg	160	23.	1
Naphthalene	ND		ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	26.	1
NDPA/DPA	ND		ug/kg	140	20.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	27.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	61.	1
Butyl benzyl phthalate	ND		ug/kg	180	44.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	60.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS****Lab ID:** L2315966-03**Date Collected:** 03/27/23 14:00**Client ID:** SB11_2-4**Date Received:** 03/27/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	16.	1
Dimethyl phthalate	ND		ug/kg	180	37.	1
Benzo(a)anthracene	83	J	ug/kg	110	20.	1
Benzo(a)pyrene	87	J	ug/kg	140	43.	1
Benzo(b)fluoranthene	97	J	ug/kg	110	30.	1
Benzo(k)fluoranthene	42	J	ug/kg	110	28.	1
Chrysene	80	J	ug/kg	110	18.	1
Acenaphthylene	ND		ug/kg	140	27.	1
Anthracene	ND		ug/kg	110	34.	1
Benzo(ghi)perylene	56	J	ug/kg	140	21.	1
Fluorene	ND		ug/kg	180	17.	1
Phenanthrene	65	J	ug/kg	110	21.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	20.	1
Indeno(1,2,3-cd)pyrene	47	J	ug/kg	140	25.	1
Pyrene	160		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	400	23.	1
4-Chloroaniline	ND		ug/kg	180	32.	1
2-Nitroaniline	ND		ug/kg	180	34.	1
3-Nitroaniline	ND		ug/kg	180	33.	1
4-Nitroaniline	ND		ug/kg	180	73.	1
Dibenzofuran	ND		ug/kg	180	17.	1
2-Methylnaphthalene	ND		ug/kg	210	21.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	18.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	26.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	28.	1
2,4-Dimethylphenol	ND		ug/kg	180	58.	1
2-Nitrophenol	ND		ug/kg	380	66.	1
4-Nitrophenol	ND		ug/kg	250	72.	1
2,4-Dinitrophenol	ND		ug/kg	850	82.	1
4,6-Dinitro-o-cresol	ND		ug/kg	460	85.	1
Pentachlorophenol	ND		ug/kg	140	39.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	27.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	250	28.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-03
Client ID: SB11_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	34.	1
Benzoic Acid	ND		ug/kg	570	180	1
Benzyl Alcohol	ND		ug/kg	180	54.	1
Carbazole	ND		ug/kg	180	17.	1
1,4-Dioxane	ND		ug/kg	26	8.1	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	81		25-120
Phenol-d6	75		10-120
Nitrobenzene-d5	78		23-120
2-Fluorobiphenyl	76		30-120
2,4,6-Tribromophenol	85		10-136
4-Terphenyl-d14	81		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-04 D2
Client ID: SB11_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:15
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 04/02/23 16:49
Analyst: CMM
Percent Solids: 82%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Fluoranthene	140000		ug/kg	12000	2300	100
Naphthalene	270000		ug/kg	20000	2500	100
Benzo(a)anthracene	120000		ug/kg	12000	2300	100
Anthracene	120000		ug/kg	12000	3900	100
Fluorene	150000		ug/kg	20000	2000	100
Phenanthrene	400000		ug/kg	12000	2400	100
Pyrene	230000		ug/kg	12000	2000	100
2-Methylnaphthalene	140000		ug/kg	24000	2400	100

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-04 D

Date Collected: 03/27/23 14:15

Client ID: SB11_12-14

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Extraction Method: EPA 3546

Analytical Method: 1,8270E

Extraction Date: 03/29/23 19:10

Analytical Date: 04/01/23 05:50

Analyst: CMM

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	56000		ug/kg	1600	210	10
1,2,4-Trichlorobenzene	ND		ug/kg	2000	230	10
Hexachlorobenzene	ND		ug/kg	1200	230	10
Bis(2-chloroethyl)ether	ND		ug/kg	1800	270	10
2-Chloronaphthalene	ND		ug/kg	2000	200	10
1,2-Dichlorobenzene	ND		ug/kg	2000	360	10
1,3-Dichlorobenzene	ND		ug/kg	2000	350	10
1,4-Dichlorobenzene	ND		ug/kg	2000	350	10
3,3'-Dichlorobenzidine	ND		ug/kg	2000	540	10
2,4-Dinitrotoluene	ND		ug/kg	2000	400	10
2,6-Dinitrotoluene	ND		ug/kg	2000	350	10
Fluoranthene	86000	E	ug/kg	1200	230	10
4-Chlorophenyl phenyl ether	ND		ug/kg	2000	220	10
4-Bromophenyl phenyl ether	ND		ug/kg	2000	310	10
Bis(2-chloroisopropyl)ether	ND		ug/kg	2400	340	10
Bis(2-chloroethoxy)methane	ND		ug/kg	2200	200	10
Hexachlorobutadiene	ND		ug/kg	2000	300	10
Hexachlorocyclopentadiene	ND		ug/kg	5800	1800	10
Hexachloroethane	ND		ug/kg	1600	330	10
Isophorone	ND		ug/kg	1800	260	10
Naphthalene	180000	E	ug/kg	2000	250	10
Nitrobenzene	ND		ug/kg	1800	300	10
NDPA/DPA	ND		ug/kg	1600	230	10
n-Nitrosodi-n-propylamine	ND		ug/kg	2000	310	10
Bis(2-ethylhexyl)phthalate	ND		ug/kg	2000	700	10
Butyl benzyl phthalate	520	J	ug/kg	2000	510	10
Di-n-butylphthalate	ND		ug/kg	2000	380	10
Di-n-octylphthalate	ND		ug/kg	2000	690	10

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-04 D

Date Collected: 03/27/23 14:15

Client ID: SB11_12-14

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	2000	190	10
Dimethyl phthalate	ND		ug/kg	2000	420	10
Benzo(a)anthracene	90000	E	ug/kg	1200	230	10
Benzo(a)pyrene	59000		ug/kg	1600	490	10
Benzo(b)fluoranthene	45000		ug/kg	1200	340	10
Benzo(k)fluoranthene	9300		ug/kg	1200	320	10
Chrysene	76000		ug/kg	1200	210	10
Acenaphthylene	38000		ug/kg	1600	310	10
Anthracene	83000	E	ug/kg	1200	390	10
Benzo(ghi)perylene	29000		ug/kg	1600	240	10
Fluorene	100000	E	ug/kg	2000	200	10
Phenanthrene	260000	E	ug/kg	1200	240	10
Dibenzo(a,h)anthracene	7000		ug/kg	1200	230	10
Indeno(1,2,3-cd)pyrene	22000		ug/kg	1600	280	10
Pyrene	150000	E	ug/kg	1200	200	10
Biphenyl	18000		ug/kg	4600	260	10
4-Chloroaniline	ND		ug/kg	2000	370	10
2-Nitroaniline	ND		ug/kg	2000	390	10
3-Nitroaniline	ND		ug/kg	2000	380	10
4-Nitroaniline	ND		ug/kg	2000	840	10
Dibenzofuran	10000		ug/kg	2000	190	10
2-Methylnaphthalene	97000	E	ug/kg	2400	240	10
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	2000	210	10
Acetophenone	ND		ug/kg	2000	250	10
2,4,6-Trichlorophenol	ND		ug/kg	1200	380	10
p-Chloro-m-cresol	ND		ug/kg	2000	300	10
2-Chlorophenol	ND		ug/kg	2000	240	10
2,4-Dichlorophenol	ND		ug/kg	1800	320	10
2,4-Dimethylphenol	ND		ug/kg	2000	670	10
2-Nitrophenol	ND		ug/kg	4400	760	10
4-Nitrophenol	ND		ug/kg	2800	820	10
2,4-Dinitrophenol	ND		ug/kg	9700	940	10
4,6-Dinitro-o-cresol	ND		ug/kg	5200	970	10
Pentachlorophenol	ND		ug/kg	1600	440	10
Phenol	ND		ug/kg	2000	300	10
2-Methylphenol	ND		ug/kg	2000	310	10
3-Methylphenol/4-Methylphenol	ND		ug/kg	2900	320	10

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-04 D

Date Collected: 03/27/23 14:15

Client ID: SB11_12-14

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	2000	390	10
Benzoic Acid	ND		ug/kg	6500	2000	10
Benzyl Alcohol	ND		ug/kg	2000	620	10
Carbazole	2800		ug/kg	2000	200	10
1,4-Dioxane	ND		ug/kg	300	93.	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	64		25-120
Phenol-d6	68		10-120
Nitrobenzene-d5	83		23-120
2-Fluorobiphenyl	66		30-120
2,4,6-Tribromophenol	52		10-136
4-Terphenyl-d14	47		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 02:30
Analyst: LJG
Percent Solids: 90%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	160	J	ug/kg	420	54.	1
1,2,4-Trichlorobenzene	ND		ug/kg	520	59.	1
Hexachlorobenzene	ND		ug/kg	310	58.	1
Bis(2-chloroethyl)ether	ND		ug/kg	470	70.	1
2-Chloronaphthalene	ND		ug/kg	520	51.	1
1,2-Dichlorobenzene	ND		ug/kg	520	93.	1
1,3-Dichlorobenzene	ND		ug/kg	520	89.	1
1,4-Dichlorobenzene	ND		ug/kg	520	90.	1
3,3'-Dichlorobenzidine	ND		ug/kg	520	140	1
2,4-Dinitrotoluene	ND		ug/kg	520	100	1
2,6-Dinitrotoluene	ND		ug/kg	520	89.	1
Fluoranthene	2200		ug/kg	310	60.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	520	56.	1
4-Bromophenyl phenyl ether	ND		ug/kg	520	79.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	620	89.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	560	52.	1
Hexachlorobutadiene	ND		ug/kg	520	76.	1
Hexachlorocyclopentadiene	ND		ug/kg	1500	470	1
Hexachloroethane	ND		ug/kg	420	84.	1
Isophorone	ND		ug/kg	470	67.	1
Naphthalene	ND		ug/kg	520	63.	1
Nitrobenzene	ND		ug/kg	470	77.	1
NDPA/DPA	ND		ug/kg	420	59.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	520	80.	1
Bis(2-ethylhexyl)phthalate	180	J	ug/kg	520	180	1
Butyl benzyl phthalate	ND		ug/kg	520	130	1
Di-n-butylphthalate	ND		ug/kg	520	98.	1
Di-n-octylphthalate	ND		ug/kg	520	180	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	520	48.	1
Dimethyl phthalate	ND		ug/kg	520	110	1
Benzo(a)anthracene	1000		ug/kg	310	58.	1
Benzo(a)pyrene	1100		ug/kg	420	130	1
Benzo(b)fluoranthene	1300		ug/kg	310	87.	1
Benzo(k)fluoranthene	410		ug/kg	310	83.	1
Chrysene	990		ug/kg	310	54.	1
Acenaphthylene	ND		ug/kg	420	80.	1
Anthracene	400		ug/kg	310	100	1
Benzo(ghi)perylene	640		ug/kg	420	61.	1
Fluorene	160	J	ug/kg	520	50.	1
Phenanthrene	1400		ug/kg	310	63.	1
Dibenzo(a,h)anthracene	140	J	ug/kg	310	60.	1
Indeno(1,2,3-cd)pyrene	590		ug/kg	420	72.	1
Pyrene	1900		ug/kg	310	52.	1
Biphenyl	ND		ug/kg	1200	67.	1
4-Chloroaniline	ND		ug/kg	520	94.	1
2-Nitroaniline	ND		ug/kg	520	100	1
3-Nitroaniline	ND		ug/kg	520	98.	1
4-Nitroaniline	ND		ug/kg	520	210	1
Dibenzofuran	82	J	ug/kg	520	49.	1
2-Methylnaphthalene	ND		ug/kg	620	63.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	520	54.	1
Acetophenone	ND		ug/kg	520	64.	1
2,4,6-Trichlorophenol	ND		ug/kg	310	98.	1
p-Chloro-m-cresol	ND		ug/kg	520	77.	1
2-Chlorophenol	ND		ug/kg	520	61.	1
2,4-Dichlorophenol	ND		ug/kg	470	83.	1
2,4-Dimethylphenol	ND		ug/kg	520	170	1
2-Nitrophenol	ND		ug/kg	1100	200	1
4-Nitrophenol	ND		ug/kg	730	210	1
2,4-Dinitrophenol	ND		ug/kg	2500	240	1
4,6-Dinitro-o-cresol	ND		ug/kg	1300	250	1
Pentachlorophenol	ND		ug/kg	420	110	1
Phenol	ND		ug/kg	520	78.	1
2-Methylphenol	ND		ug/kg	520	80.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	750	81.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	520	99.	1
Benzoic Acid	ND		ug/kg	1700	520	1
Benzyl Alcohol	ND		ug/kg	520	160	1
Carbazole	180	J	ug/kg	520	50.	1
1,4-Dioxane	ND		ug/kg	78	24.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	68		25-120
Phenol-d6	65		10-120
Nitrobenzene-d5	67		23-120
2-Fluorobiphenyl	67		30-120
2,4,6-Tribromophenol	66		10-136
4-Terphenyl-d14	67		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 03/30/23 22:11
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-05 Batch: WG1760464-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	98	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	29.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	28.
3,3'-Dichlorobenzidine	ND		ug/kg	160	43.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	98	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	17.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	26.
Isophorone	ND		ug/kg	150	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	18.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	56.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 03/30/23 22:11
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-05 Batch: WG1760464-1					
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	98	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	98	28.
Benzo(k)fluoranthene	ND		ug/kg	98	26.
Chrysene	ND		ug/kg	98	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	98	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	98	20.
Dibenzo(a,h)anthracene	ND		ug/kg	98	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	98	16.
Biphenyl	ND		ug/kg	370	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	31.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	15.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	98	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	350	61.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 03/30/23 22:11
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 03/29/23 19:10

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-05 Batch: WG1760464-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	780	76.
4,6-Dinitro-o-cresol	ND		ug/kg	420	78.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	25.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	31.
Benzoic Acid	ND		ug/kg	530	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	24	7.5

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	79		25-120
Phenol-d6	72		10-120
Nitrobenzene-d5	69		23-120
2-Fluorobiphenyl	73		30-120
2,4,6-Tribromophenol	69		10-136
4-Terphenyl-d14	74		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-05 Batch: WG1760464-2 WG1760464-3								
Acenaphthene	78		74		31-137	5		50
1,2,4-Trichlorobenzene	76		74		38-107	3		50
Hexachlorobenzene	78		74		40-140	5		50
Bis(2-chloroethyl)ether	70		68		40-140	3		50
2-Chloronaphthalene	79		74		40-140	7		50
1,2-Dichlorobenzene	74		72		40-140	3		50
1,3-Dichlorobenzene	74		73		40-140	1		50
1,4-Dichlorobenzene	73		72		28-104	1		50
3,3'-Dichlorobenzidine	66		64		40-140	3		50
2,4-Dinitrotoluene	111		104		40-132	7		50
2,6-Dinitrotoluene	100		90		40-140	11		50
Fluoranthene	79		72		40-140	9		50
4-Chlorophenyl phenyl ether	79		76		40-140	4		50
4-Bromophenyl phenyl ether	79		76		40-140	4		50
Bis(2-chloroisopropyl)ether	68		65		40-140	5		50
Bis(2-chloroethoxy)methane	74		70		40-117	6		50
Hexachlorobutadiene	80		76		40-140	5		50
Hexachlorocyclopentadiene	80		80		40-140	0		50
Hexachloroethane	77		75		40-140	3		50
Isophorone	70		67		40-140	4		50
Naphthalene	76		73		40-140	4		50
Nitrobenzene	74		72		40-140	3		50
NDPA/DPA	80		74		36-157	8		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-05 Batch: WG1760464-2 WG1760464-3								
n-Nitrosodi-n-propylamine	73		69		32-121	6		50
Bis(2-ethylhexyl)phthalate	101		96		40-140	5		50
Butyl benzyl phthalate	94		83		40-140	12		50
Di-n-butylphthalate	92		85		40-140	8		50
Di-n-octylphthalate	111		108		40-140	3		50
Diethyl phthalate	85		79		40-140	7		50
Dimethyl phthalate	84		76		40-140	10		50
Benzo(a)anthracene	82		78		40-140	5		50
Benzo(a)pyrene	93		94		40-140	1		50
Benzo(b)fluoranthene	86		86		40-140	0		50
Benzo(k)fluoranthene	93		93		40-140	0		50
Chrysene	81		76		40-140	6		50
Acenaphthylene	79		74		40-140	7		50
Anthracene	81		77		40-140	5		50
Benzo(ghi)perylene	82		82		40-140	0		50
Fluorene	78		73		40-140	7		50
Phenanthrene	79		74		40-140	7		50
Dibenzo(a,h)anthracene	81		81		40-140	0		50
Indeno(1,2,3-cd)pyrene	89		88		40-140	1		50
Pyrene	79		70		35-142	12		50
Biphenyl	81		76		37-127	6		50
4-Chloroaniline	30	Q	26	Q	40-140	14		50
2-Nitroaniline	100		91		47-134	9		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-05 Batch: WG1760464-2 WG1760464-3								
3-Nitroaniline	61		54		26-129	12		50
4-Nitroaniline	85		79		41-125	7		50
Dibenzofuran	79		74		40-140	7		50
2-Methylnaphthalene	80		76		40-140	5		50
1,2,4,5-Tetrachlorobenzene	83		79		40-117	5		50
Acetophenone	82		77		14-144	6		50
2,4,6-Trichlorophenol	90		83		30-130	8		50
p-Chloro-m-cresol	86		80		26-103	7		50
2-Chlorophenol	83		81		25-102	2		50
2,4-Dichlorophenol	84		78		30-130	7		50
2,4-Dimethylphenol	77		74		30-130	4		50
2-Nitrophenol	103		97		30-130	6		50
4-Nitrophenol	77		69		11-114	11		50
2,4-Dinitrophenol	77		74		4-130	4		50
4,6-Dinitro-o-cresol	115		106		10-130	8		50
Pentachlorophenol	68		64		17-109	6		50
Phenol	77		74		26-90	4		50
2-Methylphenol	75		71		30-130.	5		50
3-Methylphenol/4-Methylphenol	76		73		30-130	4		50
2,4,5-Trichlorophenol	90		81		30-130	11		50
Benzoic Acid	89		86		10-110	3		50
Benzyl Alcohol	75		72		40-140	4		50
Carbazole	80		74		54-128	8		50

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Lab Number: L2315966

Project Number: 170697301

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-05 Batch: WG1760464-2 WG1760464-3								
1,4-Dioxane	58		56		40-140	4		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	84		82		25-120
Phenol-d6	77		76		10-120
Nitrobenzene-d5	78		77		23-120
2-Fluorobiphenyl	77		76		30-120
2,4,6-Tribromophenol	84		82		10-136
4-Terphenyl-d14	73		69		18-120

PESTICIDES

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-01
Client ID: SB10_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:50
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 03/31/23 15:00
Analyst: MSF
Percent Solids: 89%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 18:49
Cleanup Method: EPA 3620B
Cleanup Date: 03/31/23
Cleanup Method: EPA 3660B
Cleanup Date: 03/31/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/kg	1.71	0.335	1	A
Lindane	ND		ug/kg	0.713	0.319	1	A
Alpha-BHC	ND		ug/kg	0.713	0.202	1	A
Beta-BHC	ND		ug/kg	1.71	0.649	1	A
Heptachlor	ND		ug/kg	0.856	0.384	1	A
Aldrin	ND		ug/kg	1.71	0.603	1	A
Heptachlor epoxide	2.43	JP	ug/kg	3.21	0.963	1	A
Endrin	ND		ug/kg	0.713	0.292	1	A
Endrin aldehyde	ND		ug/kg	2.14	0.749	1	A
Endrin ketone	ND		ug/kg	1.71	0.441	1	A
Dieldrin	ND		ug/kg	1.07	0.535	1	A
4,4'-DDE	14.0		ug/kg	1.71	0.396	1	B
4,4'-DDD	12.4		ug/kg	1.71	0.610	1	A
4,4'-DDT	18.7	P	ug/kg	1.71	1.38	1	B
Endosulfan I	ND		ug/kg	1.71	0.404	1	A
Endosulfan II	ND		ug/kg	1.71	0.572	1	A
Endosulfan sulfate	ND		ug/kg	0.713	0.339	1	A
Methoxychlor	ND		ug/kg	3.21	0.998	1	A
Toxaphene	ND		ug/kg	32.1	8.98	1	A
cis-Chlordane	8.22	IP	ug/kg	2.14	0.596	1	B
trans-Chlordane	11.0		ug/kg	2.14	0.565	1	A
Chlordane	57.4		ug/kg	14.3	5.67	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-01
Client ID: SB10_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:50
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	78		30-150	A
Decachlorobiphenyl	87		30-150	A
2,4,5,6-Tetrachloro-m-xylene	75		30-150	B
Decachlorobiphenyl	103		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-01
Client ID: SB10_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:50
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8151A
Analytical Date: 03/29/23 09:52
Analyst: AKM
Percent Solids: 89%
Methylation Date: 03/29/23 05:09

Extraction Method: EPA 8151A
Extraction Date: 03/28/23 16:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
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Chlorinated Herbicides by GC - Westborough Lab

2,4-D	ND		ug/kg	183	11.5	1	A
2,4,5-T	ND		ug/kg	183	5.66	1	A
2,4,5-TP (Silvex)	ND		ug/kg	183	4.86	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	99		30-150	A
DCAA	106		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-03
Client ID: SB11_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 03/31/23 15:12
Analyst: MSF
Percent Solids: 92%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 18:49
Cleanup Method: EPA 3620B
Cleanup Date: 03/31/23
Cleanup Method: EPA 3660B
Cleanup Date: 03/31/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/kg	1.73	0.338	1	A
Lindane	ND		ug/kg	0.720	0.322	1	A
Alpha-BHC	ND		ug/kg	0.720	0.204	1	A
Beta-BHC	ND		ug/kg	1.73	0.655	1	A
Heptachlor	ND		ug/kg	0.864	0.387	1	A
Aldrin	ND		ug/kg	1.73	0.608	1	A
Heptachlor epoxide	ND		ug/kg	3.24	0.972	1	A
Endrin	ND		ug/kg	0.720	0.295	1	A
Endrin aldehyde	ND		ug/kg	2.16	0.756	1	A
Endrin ketone	ND		ug/kg	1.73	0.445	1	A
Dieldrin	ND		ug/kg	1.08	0.540	1	A
4,4'-DDE	1.34	J	ug/kg	1.73	0.399	1	A
4,4'-DDD	1.72	J	ug/kg	1.73	0.616	1	B
4,4'-DDT	2.68	P	ug/kg	1.73	1.39	1	B
Endosulfan I	ND		ug/kg	1.73	0.408	1	A
Endosulfan II	ND		ug/kg	1.73	0.577	1	A
Endosulfan sulfate	ND		ug/kg	0.720	0.342	1	A
Methoxychlor	ND		ug/kg	3.24	1.01	1	A
Toxaphene	ND		ug/kg	32.4	9.07	1	A
cis-Chlordane	ND		ug/kg	2.16	0.602	1	A
trans-Chlordane	ND		ug/kg	2.16	0.570	1	A
Chlordane	ND		ug/kg	14.4	5.72	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-03
Client ID: SB11_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	72		30-150	A
Decachlorobiphenyl	81		30-150	A
2,4,5,6-Tetrachloro-m-xylene	80		30-150	B
Decachlorobiphenyl	94		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-03
Client ID: SB11_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8151A
Analytical Date: 03/29/23 10:11
Analyst: MSF
Percent Solids: 92%
Methylation Date: 03/29/23 05:09

Extraction Method: EPA 8151A
Extraction Date: 03/28/23 16:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	181	11.4	1	A
2,4,5-T	ND		ug/kg	181	5.62	1	A
2,4,5-TP (Silvex)	ND		ug/kg	181	4.82	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	87		30-150	A
DCAA	88		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 03/31/23 15:24
Analyst: MSF
Percent Solids: 90%

Extraction Method: EPA 3546
Extraction Date: 03/29/23 18:49
Cleanup Method: EPA 3620B
Cleanup Date: 03/31/23
Cleanup Method: EPA 3660B
Cleanup Date: 03/31/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/kg	1.70	0.332	1	A
Lindane	ND		ug/kg	0.708	0.316	1	A
Alpha-BHC	ND		ug/kg	0.708	0.201	1	A
Beta-BHC	ND		ug/kg	1.70	0.644	1	A
Heptachlor	ND		ug/kg	0.849	0.381	1	A
Aldrin	ND		ug/kg	1.70	0.598	1	A
Heptachlor epoxide	ND		ug/kg	3.18	0.955	1	A
Endrin	ND		ug/kg	0.708	0.290	1	A
Endrin aldehyde	ND		ug/kg	2.12	0.743	1	A
Endrin ketone	ND		ug/kg	1.70	0.437	1	A
Dieldrin	ND		ug/kg	1.06	0.531	1	A
4,4'-DDE	15.3	P	ug/kg	1.70	0.393	1	B
4,4'-DDD	13.6	P	ug/kg	1.70	0.606	1	B
4,4'-DDT	18.7	P	ug/kg	1.70	1.36	1	B
Endosulfan I	ND		ug/kg	1.70	0.401	1	A
Endosulfan II	ND		ug/kg	1.70	0.567	1	A
Endosulfan sulfate	0.554	JIP	ug/kg	0.708	0.337	1	A
Methoxychlor	ND		ug/kg	3.18	0.991	1	A
Toxaphene	ND		ug/kg	31.8	8.92	1	A
cis-Chlordane	9.30	IP	ug/kg	2.12	0.592	1	B
trans-Chlordane	7.30	IP	ug/kg	2.12	0.560	1	A
Chlordane	ND		ug/kg	14.2	5.62	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	63		30-150	A
Decachlorobiphenyl	67		30-150	A
2,4,5,6-Tetrachloro-m-xylene	82		30-150	B
Decachlorobiphenyl	110		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8151A
Analytical Date: 03/29/23 10:29
Analyst: MSF
Percent Solids: 90%
Methylation Date: 03/29/23 05:09

Extraction Method: EPA 8151A
Extraction Date: 03/28/23 16:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
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Chlorinated Herbicides by GC - Westborough Lab

2,4-D	ND		ug/kg	181	11.4	1	A
2,4,5-T	ND		ug/kg	181	5.61	1	A
2,4,5-TP (Silvex)	ND		ug/kg	181	4.81	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	91		30-150	A
DCAA	104		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8151A
 Analytical Date: 03/28/23 14:56
 Analyst: MSF
 Methylation Date: 03/28/23 13:19

Extraction Method: EPA 8151A
 Extraction Date: 03/28/23 04:52

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 01,03,05 Batch: WG1759568-1						
2,4-D	ND		ug/kg	163	10.3	A
2,4,5-T	ND		ug/kg	163	5.05	A
2,4,5-TP (Silvex)	ND		ug/kg	163	4.33	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	88		30-150	A
DCAA	85		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8081B
 Analytical Date: 03/31/23 14:25
 Analyst: AKM

Extraction Method: EPA 3546
 Extraction Date: 03/29/23 18:49
 Cleanup Method: EPA 3620B
 Cleanup Date: 03/31/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 03/31/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01,03,05 Batch: WG1760452-1						
Delta-BHC	ND		ug/kg	1.58	0.309	A
Lindane	ND		ug/kg	0.657	0.294	A
Alpha-BHC	ND		ug/kg	0.657	0.187	A
Beta-BHC	ND		ug/kg	1.58	0.598	A
Heptachlor	ND		ug/kg	0.789	0.354	A
Aldrin	ND		ug/kg	1.58	0.556	A
Heptachlor epoxide	ND		ug/kg	2.96	0.888	A
Endrin	ND		ug/kg	0.657	0.270	A
Endrin aldehyde	ND		ug/kg	1.97	0.690	A
Endrin ketone	ND		ug/kg	1.58	0.406	A
Dieldrin	ND		ug/kg	0.986	0.493	A
4,4'-DDE	ND		ug/kg	1.58	0.365	A
4,4'-DDD	ND		ug/kg	1.58	0.563	A
4,4'-DDT	ND		ug/kg	1.58	1.27	A
Endosulfan I	ND		ug/kg	1.58	0.373	A
Endosulfan II	ND		ug/kg	1.58	0.527	A
Endosulfan sulfate	ND		ug/kg	0.657	0.313	A
Methoxychlor	ND		ug/kg	2.96	0.920	A
Toxaphene	ND		ug/kg	29.6	8.28	A
cis-Chlordane	ND		ug/kg	1.97	0.550	A
trans-Chlordane	ND		ug/kg	1.97	0.521	A
Chlordane	ND		ug/kg	13.1	5.23	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
 Analytical Date: 03/31/23 14:25
 Analyst: AKM

Extraction Method: EPA 3546
 Extraction Date: 03/29/23 18:49
 Cleanup Method: EPA 3620B
 Cleanup Date: 03/31/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 03/31/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01,03,05 Batch: WG1760452-1						

Surrogate	%Recovery	Qualifier	Acceptance	
			Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	81		30-150	A
Decachlorobiphenyl	94		30-150	A
2,4,5,6-Tetrachloro-m-xylene	81		30-150	B
Decachlorobiphenyl	93		30-150	B

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH STREET**Project Number:** 170697301**Lab Number:** L2315966**Report Date:** 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 01,03,05 Batch: WG1759568-2 WG1759568-3									
2,4-D	87		86		30-150	1		30	A
2,4,5-T	91		89		30-150	2		30	A
2,4,5-TP (Silvex)	88		87		30-150	1		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	83		80		30-150	A
DCAA	87		84		30-150	B

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01,03,05 Batch: WG1760452-2 WG1760452-3									
Delta-BHC	77		85		30-150	10		30	A
Lindane	76		84		30-150	10		30	A
Alpha-BHC	79		88		30-150	11		30	A
Beta-BHC	86		91		30-150	6		30	A
Heptachlor	78		87		30-150	11		30	A
Aldrin	76		85		30-150	11		30	A
Heptachlor epoxide	65		72		30-150	10		30	A
Endrin	75		83		30-150	10		30	A
Endrin aldehyde	56		61		30-150	9		30	A
Endrin ketone	67		72		30-150	7		30	A
Dieldrin	78		86		30-150	10		30	A
4,4'-DDE	72		80		30-150	11		30	A
4,4'-DDD	79		88		30-150	11		30	A
4,4'-DDT	82		92		30-150	11		30	A
Endosulfan I	72		80		30-150	11		30	A
Endosulfan II	76		80		30-150	5		30	A
Endosulfan sulfate	50		57		30-150	13		30	A
Methoxychlor	90		95		30-150	5		30	A
cis-Chlordane	76		84		30-150	10		30	A
trans-Chlordane	93		103		30-150	10		30	A

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01,03,05 Batch: WG1760452-2 WG1760452-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	72		76		30-150	A
Decachlorobiphenyl	89		91		30-150	A
2,4,5,6-Tetrachloro-m-xylene	74		78		30-150	B
Decachlorobiphenyl	91		92		30-150	B

METALS

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-01

Date Collected: 03/27/23 15:50

Client ID: SB10_2-4

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	6430		mg/kg	8.59	2.32	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Antimony, Total	0.903	J	mg/kg	4.30	0.326	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Arsenic, Total	4.54		mg/kg	0.859	0.179	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Barium, Total	111		mg/kg	0.859	0.149	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.612		mg/kg	0.430	0.028	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Cadmium, Total	0.555	J	mg/kg	0.859	0.084	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Calcium, Total	11400		mg/kg	8.59	3.01	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Chromium, Total	15.7		mg/kg	0.859	0.083	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Cobalt, Total	8.42		mg/kg	1.72	0.143	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Copper, Total	32.2		mg/kg	0.859	0.222	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Iron, Total	12700		mg/kg	4.30	0.776	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Lead, Total	113		mg/kg	4.30	0.230	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Magnesium, Total	3590		mg/kg	8.59	1.32	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Manganese, Total	232		mg/kg	0.859	0.136	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Mercury, Total	0.174		mg/kg	0.086	0.056	1	03/30/23 10:40	03/31/23 17:38	EPA 7471B	1,7471B	ZNK
Nickel, Total	37.5		mg/kg	2.15	0.208	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Potassium, Total	915		mg/kg	215	12.4	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.72	0.222	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.430	0.243	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Sodium, Total	139	J	mg/kg	172	2.71	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.72	0.271	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Vanadium, Total	20.6		mg/kg	0.859	0.174	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL
Zinc, Total	119		mg/kg	4.30	0.252	2	03/30/23 09:22	03/30/23 19:57	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	15.1	J	mg/kg	0.897	0.897	1		03/31/23 11:47	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-02

Date Collected: 03/27/23 15:55

Client ID: SB10_12-13.5

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	4340		mg/kg	9.57	2.58	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Antimony, Total	0.979	J	mg/kg	4.78	0.364	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Arsenic, Total	3.28		mg/kg	0.957	0.199	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Barium, Total	75.8		mg/kg	0.957	0.166	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.356	J	mg/kg	0.478	0.032	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Cadmium, Total	1.09		mg/kg	0.957	0.094	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Calcium, Total	36600		mg/kg	9.57	3.35	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Chromium, Total	11.6		mg/kg	0.957	0.092	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Cobalt, Total	6.13		mg/kg	1.91	0.159	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Copper, Total	20.7		mg/kg	0.957	0.247	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Iron, Total	11600		mg/kg	4.78	0.864	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Lead, Total	33.0		mg/kg	4.78	0.256	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Magnesium, Total	13900		mg/kg	9.57	1.47	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Manganese, Total	210		mg/kg	0.957	0.152	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Mercury, Total	0.061	J	mg/kg	0.091	0.060	1	03/30/23 10:40	03/31/23 17:41	EPA 7471B	1,7471B	ZNK
Nickel, Total	33.1		mg/kg	2.39	0.232	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Potassium, Total	531		mg/kg	239	13.8	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.91	0.247	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.478	0.271	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Sodium, Total	259		mg/kg	191	3.01	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.91	0.301	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Vanadium, Total	24.2		mg/kg	0.957	0.194	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL
Zinc, Total	73.3		mg/kg	4.78	0.280	2	03/30/23 09:22	03/30/23 20:01	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	11.6		mg/kg	1.00	1.00	1		03/31/23 11:47	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-03

Date Collected: 03/27/23 14:00

Client ID: SB11_2-4

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	5590		mg/kg	8.54	2.30	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Antimony, Total	0.862	J	mg/kg	4.27	0.324	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Arsenic, Total	4.64		mg/kg	0.854	0.178	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Barium, Total	118		mg/kg	0.854	0.148	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.524		mg/kg	0.427	0.028	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Cadmium, Total	0.332	J	mg/kg	0.854	0.084	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Calcium, Total	9550		mg/kg	8.54	2.99	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Chromium, Total	12.4		mg/kg	0.854	0.082	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Cobalt, Total	7.27		mg/kg	1.71	0.142	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Copper, Total	19.2		mg/kg	0.854	0.220	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Iron, Total	12400		mg/kg	4.27	0.771	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Lead, Total	40.7		mg/kg	4.27	0.229	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Magnesium, Total	2200		mg/kg	8.54	1.31	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Manganese, Total	312		mg/kg	0.854	0.136	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Mercury, Total	0.072	J	mg/kg	0.082	0.053	1	03/30/23 10:40	03/31/23 17:45	EPA 7471B	1,7471B	ZNK
Nickel, Total	43.5		mg/kg	2.13	0.206	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Potassium, Total	706		mg/kg	213	12.3	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.71	0.220	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.427	0.242	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Sodium, Total	93.2	J	mg/kg	171	2.69	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.71	0.269	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Vanadium, Total	124		mg/kg	0.854	0.173	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL
Zinc, Total	75.6		mg/kg	4.27	0.250	2	03/30/23 09:22	03/30/23 20:06	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	12.4		mg/kg	0.873	0.873	1		03/31/23 11:47	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-04

Date Collected: 03/27/23 14:15

Client ID: SB11_12-14

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	1260		mg/kg	9.50	2.57	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Antimony, Total	1.69	J	mg/kg	4.75	0.361	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Arsenic, Total	9.75		mg/kg	0.950	0.198	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Barium, Total	41.8		mg/kg	0.950	0.165	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.278	J	mg/kg	0.475	0.031	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Cadmium, Total	0.437	J	mg/kg	0.950	0.093	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Calcium, Total	2600		mg/kg	9.50	3.33	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Chromium, Total	27.8		mg/kg	0.950	0.091	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Cobalt, Total	9.63		mg/kg	1.90	0.158	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Copper, Total	79.3		mg/kg	0.950	0.245	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Iron, Total	21700		mg/kg	4.75	0.858	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Lead, Total	61.0		mg/kg	4.75	0.255	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Magnesium, Total	404		mg/kg	9.50	1.46	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Manganese, Total	30.5		mg/kg	0.950	0.151	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Mercury, Total	0.206		mg/kg	0.097	0.064	1	03/30/23 10:40	03/31/23 17:48	EPA 7471B	1,7471B	ZNK
Nickel, Total	24.4		mg/kg	2.38	0.230	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Potassium, Total	239		mg/kg	238	13.7	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Selenium, Total	0.466	J	mg/kg	1.90	0.245	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.475	0.269	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Sodium, Total	248		mg/kg	190	2.99	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.90	0.299	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Vanadium, Total	50.8		mg/kg	0.950	0.193	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL
Zinc, Total	35.8		mg/kg	4.75	0.278	2	03/30/23 09:22	03/30/23 20:10	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	27.8		mg/kg	0.982	0.982	1		03/31/23 11:47	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**SAMPLE RESULTS**

Lab ID: L2315966-05

Date Collected: 03/27/23 00:00

Client ID: SODUP01_032723

Date Received: 03/27/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	6440		mg/kg	8.82	2.38	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Antimony, Total	1.02	J	mg/kg	4.41	0.335	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Arsenic, Total	4.63		mg/kg	0.882	0.183	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Barium, Total	121		mg/kg	0.882	0.153	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.610		mg/kg	0.441	0.029	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Cadmium, Total	0.585	J	mg/kg	0.882	0.086	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Calcium, Total	12500		mg/kg	8.82	3.09	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Chromium, Total	17.6		mg/kg	0.882	0.085	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Cobalt, Total	8.66		mg/kg	1.76	0.146	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Copper, Total	31.4		mg/kg	0.882	0.228	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Iron, Total	12400		mg/kg	4.41	0.796	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Lead, Total	111		mg/kg	4.41	0.236	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Magnesium, Total	3370		mg/kg	8.82	1.36	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Manganese, Total	252		mg/kg	0.882	0.140	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Mercury, Total	0.173		mg/kg	0.084	0.055	1	03/30/23 10:40	03/31/23 17:51	EPA 7471B	1,7471B	ZNK
Nickel, Total	36.6		mg/kg	2.20	0.213	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Potassium, Total	931		mg/kg	220	12.7	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.76	0.228	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.441	0.250	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Sodium, Total	156	J	mg/kg	176	2.78	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.76	0.278	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Vanadium, Total	20.5		mg/kg	0.882	0.179	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL
Zinc, Total	128		mg/kg	4.41	0.258	2	03/30/23 09:22	03/30/23 20:15	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	17.6		mg/kg	0.890	0.890	1		03/31/23 11:47	NA	107,-	
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Project Name: 2731 W 12TH STREET

Lab Number: L2315966

Project Number: 170697301

Report Date: 04/03/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-05 Batch: WG1759741-1										
Aluminum, Total	ND		mg/kg	4.00	1.08	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Antimony, Total	ND		mg/kg	2.00	0.152	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Arsenic, Total	ND		mg/kg	0.400	0.083	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Barium, Total	ND		mg/kg	0.400	0.070	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Beryllium, Total	ND		mg/kg	0.200	0.013	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Cadmium, Total	ND		mg/kg	0.400	0.039	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Calcium, Total	ND		mg/kg	4.00	1.40	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Chromium, Total	ND		mg/kg	0.400	0.038	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Cobalt, Total	ND		mg/kg	0.800	0.066	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Copper, Total	ND		mg/kg	0.400	0.103	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Iron, Total	0.442	J	mg/kg	2.00	0.361	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Lead, Total	ND		mg/kg	2.00	0.107	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Magnesium, Total	ND		mg/kg	4.00	0.616	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Manganese, Total	ND		mg/kg	0.400	0.064	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Nickel, Total	ND		mg/kg	1.00	0.097	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Potassium, Total	ND		mg/kg	100	5.76	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Selenium, Total	ND		mg/kg	0.800	0.103	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Silver, Total	ND		mg/kg	0.200	0.113	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Sodium, Total	ND		mg/kg	80.0	1.26	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Thallium, Total	ND		mg/kg	0.800	0.126	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Vanadium, Total	ND		mg/kg	0.400	0.081	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF
Zinc, Total	0.256	J	mg/kg	2.00	0.117	1	03/30/23 09:22	03/30/23 16:00	1,6010D	JMF

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-05 Batch: WG1759742-1										
Mercury, Total	ND		mg/kg	0.083	0.054	1	03/30/23 10:40	03/31/23 16:39	1,7471B	ZNK



Project Name: 2731 W 12TH STREET

Lab Number: L2315966

Project Number: 170697301

Report Date: 04/03/23

Method Blank Analysis Batch Quality Control

Prep Information

Digestion Method: EPA 7471B

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05 Batch: WG1759741-2 SRM Lot Number: D116-540								
Aluminum, Total	83		-		45-155	-		
Antimony, Total	175		-		2-205	-		
Arsenic, Total	104		-		82-119	-		
Barium, Total	94		-		82-118	-		
Beryllium, Total	100		-		82-118	-		
Cadmium, Total	98		-		82-118	-		
Calcium, Total	95		-		81-119	-		
Chromium, Total	98		-		81-118	-		
Cobalt, Total	99		-		83-117	-		
Copper, Total	104		-		83-117	-		
Iron, Total	104		-		58-142	-		
Lead, Total	98		-		83-117	-		
Magnesium, Total	93		-		75-125	-		
Manganese, Total	97		-		82-118	-		
Nickel, Total	99		-		82-118	-		
Potassium, Total	91		-		68-131	-		
Selenium, Total	98		-		78-122	-		
Silver, Total	104		-		79-121	-		
Sodium, Total	99		-		71-130	-		
Thallium, Total	102		-		80-120	-		
Vanadium, Total	101		-		78-122	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05 Batch: WG1759741-2 SRM Lot Number: D116-540					
Zinc, Total	97	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01-05 Batch: WG1759742-2 SRM Lot Number: D116-540					
Mercury, Total	98	-	58-142	-	

Matrix Spike Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05			QC Batch ID: WG1759741-3			QC Sample: L2247191-08			Client ID: MS Sample			
Aluminum, Total	5190	178	6300	622	Q	-	-		75-125	-		20
Antimony, Total	2.10J	44.6	45.2	101		-	-		75-125	-		20
Arsenic, Total	7.72	10.7	19.8	113		-	-		75-125	-		20
Barium, Total	84.3	178	240	87		-	-		75-125	-		20
Beryllium, Total	1.20	4.46	5.30	92		-	-		75-125	-		20
Cadmium, Total	1.45	4.73	5.51	86		-	-		75-125	-		20
Calcium, Total	58500	892	58700	22	Q	-	-		75-125	-		20
Chromium, Total	10.2	17.8	29.1	106		-	-		75-125	-		20
Cobalt, Total	5.85	44.6	44.6	87		-	-		75-125	-		20
Copper, Total	33.9	22.3	67.0	148	Q	-	-		75-125	-		20
Iron, Total	18600	89.2	22600	4480	Q	-	-		75-125	-		20
Lead, Total	293	47.3	331	80		-	-		75-125	-		20
Magnesium, Total	16700	892	18300	179	Q	-	-		75-125	-		20
Manganese, Total	649	44.6	654	11	Q	-	-		75-125	-		20
Nickel, Total	10.7	44.6	48.3	84		-	-		75-125	-		20
Potassium, Total	686	892	1630	106		-	-		75-125	-		20
Selenium, Total	ND	10.7	9.28	87		-	-		75-125	-		20
Silver, Total	ND	4.46	4.20	94		-	-		75-125	-		20
Sodium, Total	162	892	1030	97		-	-		75-125	-		20
Thallium, Total	ND	10.7	9.00	84		-	-		75-125	-		20
Vanadium, Total	17.1	44.6	60.3	97		-	-		75-125	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits	
Total Metals - Mansfield Lab Associated sample(s): 01-05			QC Batch ID: WG1759741-3		QC Sample: L2247191-08		Client ID: MS Sample			
Zinc, Total	364	44.6	526	363	Q	-	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-05			QC Batch ID: WG1759742-3		QC Sample: L2200083-98		Client ID: MS Sample			
Mercury, Total	0.050J	1.5	1.55	103	-	-	-	80-120	-	20

Lab Duplicate Analysis *Batch Quality Control*

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1759741-4 QC Sample: L2247191-08 Client ID: DUP Sample						
Antimony, Total	2.10J	1.60J	mg/kg	NC		20
Arsenic, Total	7.72	6.77	mg/kg	13		20
Beryllium, Total	1.20	1.29	mg/kg	7		20
Cadmium, Total	1.45	1.08	mg/kg	29	Q	20
Chromium, Total	10.2	7.38	mg/kg	32	Q	20
Copper, Total	33.9	25.2	mg/kg	29	Q	20
Lead, Total	293	274	mg/kg	7		20
Nickel, Total	10.7	9.25	mg/kg	15		20
Selenium, Total	ND	ND	mg/kg	NC		20
Silver, Total	ND	ND	mg/kg	NC		20
Thallium, Total	ND	ND	mg/kg	NC		20
Zinc, Total	364	252	mg/kg	36	Q	20
Total Metals - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1759742-4 QC Sample: L2200083-98 Client ID: DUP Sample						
Mercury, Total	0.050J	0.052J	mg/kg	NC		20

INORGANICS & MISCELLANEOUS

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-01

Client ID: SB10_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:50

Date Received: 03/27/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.2		%	0.100	NA	1	-	03/28/23 11:20	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.0	0.22	1	03/31/23 12:30	04/03/23 12:21	1,9010C/9012B	JER
Chromium, Hexavalent	0.605	J	mg/kg	0.897	0.179	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-02

Client ID: SB10_12-13.5

Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 15:55

Date Received: 03/27/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	79.7		%	0.100	NA	1	-	03/28/23 11:20	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.2	0.25	1	03/31/23 12:30	04/03/23 12:24	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	1.00	0.201	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-03

Client ID: SB11_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 14:00

Date Received: 03/27/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.6		%	0.100	NA	1	-	03/28/23 11:20	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.1	0.23	1	03/31/23 12:30	04/03/23 12:25	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.873	0.175	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET**Project Number:** 170697301**Lab Number:** L2315966**Report Date:** 04/03/23**SAMPLE RESULTS****Lab ID:** L2315966-04**Client ID:** SB11_12-14**Sample Location:** BROOKLYN, NY**Date Collected:** 03/27/23 14:15**Date Received:** 03/27/23**Field Prep:** Not Specified**Sample Depth:****Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.5		%	0.100	NA	1	-	03/28/23 11:20	121,2540G	ROI
Cyanide, Total	2.7		mg/kg	1.2	0.24	1	03/31/23 12:30	04/03/23 12:26	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.982	0.196	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

SAMPLE RESULTS

Lab ID: L2315966-05
Client ID: SODUP01_032723
Sample Location: BROOKLYN, NY

Date Collected: 03/27/23 00:00
Date Received: 03/27/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.9		%	0.100	NA	1	-	03/28/23 11:20	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.1	0.23	1	03/31/23 12:30	04/03/23 12:27	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.890	0.178	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1760922-1										
Chromium, Hexavalent	0.220	J	mg/kg	0.800	0.160	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1761161-1										
Cyanide, Total	ND		mg/kg	0.87	0.18	1	03/31/23 12:30	04/03/23 12:15	1,9010C/9012B	JER

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1760922-2								
Chromium, Hexavalent	70		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1761161-2 WG1761161-3								
Cyanide, Total	87		92		80-120	6		35

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1760922-4 QC Sample: L2315966-05 Client ID: SODUP01_032723												
Chromium, Hexavalent	ND	1530	1290	84		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1761161-4 WG1761161-5 QC Sample: L2315966-01 Client ID: SB10_2-4												
Cyanide, Total	ND	10	8.5	85		9.4	94		75-125	10		35

Lab Duplicate Analysis *Batch Quality Control*

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2315966

Report Date: 04/03/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1759669-1 QC Sample: L2315958-03 Client ID: DUP Sample						
Solids, Total	84.7	82.1	%	3		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1760922-6 QC Sample: L2315966-05 Client ID: SODUP01_032723						
Chromium, Hexavalent	ND	0.200J	mg/kg	NC		20

Project Name: 2731 W 12TH STREET**Lab Number:** L2315966**Project Number:** 170697301**Report Date:** 04/03/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2315966-01A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.3	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),NI-TI(180),TL-TI(180),AL-TI(180),CR-TI(180),PB-TI(180),SB-TI(180),CU-TI(180),SE-TI(180),ZN-TI(180),V-TI(180),CO-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),K-TI(180),CA-TI(180),NA-TI(180),CD-TI(180)
L2315966-01B	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		NYTCL-8270(14),TCN-9010(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)
L2315966-01C	Glass 500ml/16oz unpreserved	A	NA		2.3	Y	Absent		NYTCL-8270(14),TCN-9010(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)
L2315966-02A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.3	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),AL-TI(180),TL-TI(180),CR-TI(180),NI-TI(180),CU-TI(180),SB-TI(180),ZN-TI(180),PB-TI(180),SE-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MG-TI(180),MN-TI(180),K-TI(180),CA-TI(180),CD-TI(180),NA-TI(180)
L2315966-02B	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		TCN-9010(14),NYTCL-8270(14),TS(7),HEXCR-7196(30)
L2315966-02C	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		TCN-9010(14),NYTCL-8270(14),TS(7),HEXCR-7196(30)
L2315966-03A	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),TL-TI(180),NI-TI(180),CR-TI(180),SE-TI(180),CU-TI(180),PB-TI(180),ZN-TI(180),SB-TI(180),CO-TI(180),V-TI(180),HG-T(28),MG-TI(180),FE-TI(180),MN-TI(180),CD-TI(180),CA-TI(180),K-TI(180),NA-TI(180)
L2315966-03B	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		NYTCL-8270(14),TCN-9010(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)
L2315966-03C	Glass 500ml/16oz unpreserved	A	NA		2.3	Y	Absent		NYTCL-8270(14),TCN-9010(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Serial_No: 04032314:49
Lab Number: L2315966
Report Date: 04/03/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2315966-04A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.3	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),TL-TI(180),NI-TI(180),PB-TI(180),SB-TI(180),ZN-TI(180),CU-TI(180),SE-TI(180),V-TI(180),CO-TI(180),MN-TI(180),MG-TI(180),FE-TI(180),HG-T(28),CA-TI(180),NA-TI(180),CD-TI(180),K-TI(180)
L2315966-04B	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		TCN-9010(14),NYTCL-8270(14),TS(7),HEXCR-7196(30)
L2315966-04C	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		TCN-9010(14),NYTCL-8270(14),TS(7),HEXCR-7196(30)
L2315966-05A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.3	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),NI-TI(180),TL-TI(180),AL-TI(180),CR-TI(180),SE-TI(180),ZN-TI(180),PB-TI(180),SB-TI(180),CU-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NA-TI(180),CA-TI(180),CD-TI(180),K-TI(180)
L2315966-05B	Glass 120ml/4oz unpreserved	A	NA		2.3	Y	Absent		TCN-9010(14),NYTCL-8270(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)
L2315966-05C	Glass 500ml/16oz unpreserved	A	NA		2.3	Y	Absent		TCN-9010(14),NYTCL-8270(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2315966
Report Date: 04/03/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 107 Alpha Analytical - In-house calculation method.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpineol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

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ANALYTICAL REPORT

Lab Number:	L2316244
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Elizabeth Adkins
Phone:	(212) 479-5400
Project Name:	2731 W 12TH STREET
Project Number:	170697301
Report Date:	04/04/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2316244-01	SB08_0-2	SOIL	BROOKLYN, NY	03/28/23 15:20	03/28/23
L2316244-02	SB08_12-14	SOIL	BROOKLYN, NY	03/28/23 16:10	03/28/23
L2316244-03	SB09_2-4	SOIL	BROOKLYN, NY	03/28/23 12:05	03/28/23
L2316244-04	SB09_12-13.5	SOIL	BROOKLYN, NY	03/28/23 12:15	03/28/23
L2316244-05	SB12_0-2	SOIL	BROOKLYN, NY	03/28/23 14:15	03/28/23
L2316244-06	SB12_13.5-15	SOIL	BROOKLYN, NY	03/28/23 14:35	03/28/23
L2316244-07	SOFB01_032823	WATER	BROOKLYN, NY	03/28/23 16:15	03/28/23
L2316244-08	TB01_032823	WATER	BROOKLYN, NY	03/28/23 16:25	03/28/23
L2316244-10	SB11_2-4	SOIL	BROOKLYN, NY	03/27/23 12:20	03/28/23
L2316244-11	SB12-12-13.5	SOIL	BROOKLYN, NY	03/28/23 14:35	03/28/23

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2316244-06: Sample containers for Volatile Organics were received for the "SB12_13.5-15" sample, but were not listed on the chain of custody. At the client's request, the analysis was performed.

L2316244-10: A sample identified as "SB11_2-4" was received, but not listed on the Chain of Custody. At the client's request, this sample was not analyzed.

L2316244-11: A sample identified as "SB12-12-13.5" was received, but not listed on the Chain of Custody. At the client's request, this sample was not analyzed.

Volatile Organics

L2316244-04: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (278%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

Semivolatile Organics

The WG1761640-3 LCS recoveries, associated with L2316244-07, are below the acceptance criteria for benzidine (5%); however, it has been identified as a "difficult" analyte. The results of the associated samples are reported.

Semivolatile Organics by SIM

The WG1761642-1 Method Blank, associated with L2316244-07, has concentrations above the reporting limits for acenaphthene, naphthalene, acenaphthylene, fluorene, phenanthrene, and 2-methylnaphthalene. Since the associated sample concentrations are non-detect to the RL for these target analytes, no corrective action is required.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Case Narrative (continued)

Total Metals

L2316244-01 through 06: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

Hexavalent Chromium


The WG1760922-2 LCS recovery for chromium, hexavalent (70%), associated with L2316244-01 through -05, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

The WG1761993-2 LCS recovery for chromium, hexavalent (79%), associated with L2316244-06, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

The WG1761993-4 Insoluble MS recovery for chromium, hexavalent (50%), performed on L2316244-06, is outside the acceptance criteria. The Soluble MS recovery for chromium, hexavalent (64%) was also outside criteria. This has been attributed to matrix interference. A post-spike was performed with a recovery of 96%.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 04/04/23

ORGANICS

VOLATILES

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01
Client ID: SB08_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 03/30/23 15:08
Analyst: KJD
Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	5.3	2.4	1
1,1-Dichloroethane	ND		ug/kg	1.0	0.15	1
Chloroform	ND		ug/kg	1.6	0.15	1
Carbon tetrachloride	ND		ug/kg	1.0	0.24	1
1,2-Dichloropropane	ND		ug/kg	1.0	0.13	1
Dibromochloromethane	ND		ug/kg	1.0	0.15	1
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.28	1
Tetrachloroethene	ND		ug/kg	0.53	0.21	1
Chlorobenzene	ND		ug/kg	0.53	0.13	1
Trichlorofluoromethane	ND		ug/kg	4.2	0.73	1
1,2-Dichloroethane	ND		ug/kg	1.0	0.27	1
1,1,1-Trichloroethane	ND		ug/kg	0.53	0.18	1
Bromodichloromethane	ND		ug/kg	0.53	0.11	1
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.29	1
cis-1,3-Dichloropropene	ND		ug/kg	0.53	0.17	1
1,3-Dichloropropene, Total	ND		ug/kg	0.53	0.17	1
1,1-Dichloropropene	ND		ug/kg	0.53	0.17	1
Bromoform	ND		ug/kg	4.2	0.26	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.53	0.17	1
Benzene	ND		ug/kg	0.53	0.17	1
Toluene	ND		ug/kg	1.0	0.57	1
Ethylbenzene	ND		ug/kg	1.0	0.15	1
Chloromethane	ND		ug/kg	4.2	0.98	1
Bromomethane	ND		ug/kg	2.1	0.61	1
Vinyl chloride	ND		ug/kg	1.0	0.35	1
Chloroethane	ND		ug/kg	2.1	0.48	1
1,1-Dichloroethene	ND		ug/kg	1.0	0.25	1
trans-1,2-Dichloroethene	ND		ug/kg	1.6	0.14	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS****Lab ID:** L2316244-01**Date Collected:** 03/28/23 15:20**Client ID:** SB08_0-2**Date Received:** 03/28/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.53	0.14	1
1,2-Dichlorobenzene	ND		ug/kg	2.1	0.15	1
1,3-Dichlorobenzene	ND		ug/kg	2.1	0.16	1
1,4-Dichlorobenzene	ND		ug/kg	2.1	0.18	1
Methyl tert butyl ether	ND		ug/kg	2.1	0.21	1
p/m-Xylene	ND		ug/kg	2.1	0.59	1
o-Xylene	ND		ug/kg	1.0	0.31	1
Xylenes, Total	ND		ug/kg	1.0	0.31	1
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18	1
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14	1
Dibromomethane	ND		ug/kg	2.1	0.25	1
Styrene	ND		ug/kg	1.0	0.21	1
Dichlorodifluoromethane	ND		ug/kg	10	0.96	1
Acetone	8.3	J	ug/kg	10	5.1	1
Carbon disulfide	ND		ug/kg	10	4.8	1
2-Butanone	ND		ug/kg	10	2.3	1
Vinyl acetate	ND		ug/kg	10	2.3	1
4-Methyl-2-pentanone	ND		ug/kg	10	1.3	1
1,2,3-Trichloropropane	ND		ug/kg	2.1	0.13	1
2-Hexanone	ND		ug/kg	10	1.2	1
Bromochloromethane	ND		ug/kg	2.1	0.22	1
2,2-Dichloropropane	ND		ug/kg	2.1	0.21	1
1,2-Dibromoethane	ND		ug/kg	1.0	0.29	1
1,3-Dichloropropane	ND		ug/kg	2.1	0.18	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.53	0.14	1
Bromobenzene	ND		ug/kg	2.1	0.15	1
n-Butylbenzene	ND		ug/kg	1.0	0.18	1
sec-Butylbenzene	ND		ug/kg	1.0	0.15	1
tert-Butylbenzene	ND		ug/kg	2.1	0.12	1
o-Chlorotoluene	ND		ug/kg	2.1	0.20	1
p-Chlorotoluene	ND		ug/kg	2.1	0.11	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.2	1.0	1
Hexachlorobutadiene	ND		ug/kg	4.2	0.18	1
Isopropylbenzene	ND		ug/kg	1.0	0.11	1
p-Isopropyltoluene	ND		ug/kg	1.0	0.11	1
Naphthalene	1.9	J	ug/kg	4.2	0.68	1
Acrylonitrile	ND		ug/kg	4.2	1.2	1



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01
Client ID: SB08_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	ND		ug/kg	1.0	0.18	1
1,2,3-Trichlorobenzene	ND		ug/kg	2.1	0.34	1
1,2,4-Trichlorobenzene	ND		ug/kg	2.1	0.29	1
1,3,5-Trimethylbenzene	ND		ug/kg	2.1	0.20	1
1,2,4-Trimethylbenzene	ND		ug/kg	2.1	0.35	1
1,4-Dioxane	ND		ug/kg	84	37.	1
p-Diethylbenzene	ND		ug/kg	2.1	0.19	1
p-Ethyltoluene	ND		ug/kg	2.1	0.40	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.1	0.20	1
Ethyl ether	ND		ug/kg	2.1	0.36	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.3	1.5	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	89		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	119		70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-04
Client ID: SB09_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 03/31/23 13:45
Analyst: JIC
Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	9.6	4.4	1
1,1-Dichloroethane	ND		ug/kg	1.9	0.28	1
Chloroform	ND		ug/kg	2.9	0.27	1
Carbon tetrachloride	ND		ug/kg	1.9	0.44	1
1,2-Dichloropropane	ND		ug/kg	1.9	0.24	1
Dibromochloromethane	ND		ug/kg	1.9	0.27	1
1,1,2-Trichloroethane	ND		ug/kg	1.9	0.51	1
Tetrachloroethene	ND		ug/kg	0.96	0.38	1
Chlorobenzene	ND		ug/kg	0.96	0.24	1
Trichlorofluoromethane	ND		ug/kg	7.7	1.3	1
1,2-Dichloroethane	ND		ug/kg	1.9	0.50	1
1,1,1-Trichloroethane	ND		ug/kg	0.96	0.32	1
Bromodichloromethane	ND		ug/kg	0.96	0.21	1
trans-1,3-Dichloropropene	ND		ug/kg	1.9	0.53	1
cis-1,3-Dichloropropene	ND		ug/kg	0.96	0.30	1
1,3-Dichloropropene, Total	ND		ug/kg	0.96	0.30	1
1,1-Dichloropropene	ND		ug/kg	0.96	0.31	1
Bromoform	ND		ug/kg	7.7	0.47	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.96	0.32	1
Benzene	2.6		ug/kg	0.96	0.32	1
Toluene	1.0	J	ug/kg	1.9	1.0	1
Ethylbenzene	0.92	J	ug/kg	1.9	0.27	1
Chloromethane	ND		ug/kg	7.7	1.8	1
Bromomethane	ND		ug/kg	3.8	1.1	1
Vinyl chloride	ND		ug/kg	1.9	0.65	1
Chloroethane	ND		ug/kg	3.8	0.87	1
1,1-Dichloroethene	ND		ug/kg	1.9	0.46	1
trans-1,2-Dichloroethene	ND		ug/kg	2.9	0.26	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-04
 Client ID: SB09_12-13.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
 Date Received: 03/28/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.96	0.26	1
1,2-Dichlorobenzene	ND		ug/kg	3.8	0.28	1
1,3-Dichlorobenzene	ND		ug/kg	3.8	0.28	1
1,4-Dichlorobenzene	ND		ug/kg	3.8	0.33	1
Methyl tert butyl ether	ND		ug/kg	3.8	0.39	1
p/m-Xylene	1.6	J	ug/kg	3.8	1.1	1
o-Xylene	1.5	J	ug/kg	1.9	0.56	1
Xylenes, Total	3.1	J	ug/kg	1.9	0.56	1
cis-1,2-Dichloroethene	ND		ug/kg	1.9	0.34	1
1,2-Dichloroethene, Total	ND		ug/kg	1.9	0.26	1
Dibromomethane	ND		ug/kg	3.8	0.46	1
Styrene	ND		ug/kg	1.9	0.38	1
Dichlorodifluoromethane	ND		ug/kg	19	1.8	1
Acetone	120		ug/kg	19	9.3	1
Carbon disulfide	17	J	ug/kg	19	8.8	1
2-Butanone	ND		ug/kg	19	4.3	1
Vinyl acetate	ND		ug/kg	19	4.1	1
4-Methyl-2-pentanone	ND		ug/kg	19	2.5	1
1,2,3-Trichloropropane	ND		ug/kg	3.8	0.24	1
2-Hexanone	ND		ug/kg	19	2.3	1
Bromochloromethane	ND		ug/kg	3.8	0.40	1
2,2-Dichloropropane	ND		ug/kg	3.8	0.39	1
1,2-Dibromoethane	ND		ug/kg	1.9	0.54	1
1,3-Dichloropropane	ND		ug/kg	3.8	0.32	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.96	0.25	1
Bromobenzene	ND		ug/kg	3.8	0.28	1
n-Butylbenzene	14		ug/kg	1.9	0.32	1
sec-Butylbenzene	28		ug/kg	1.9	0.28	1
tert-Butylbenzene	3.2	J	ug/kg	3.8	0.23	1
o-Chlorotoluene	ND		ug/kg	3.8	0.37	1
p-Chlorotoluene	ND		ug/kg	3.8	0.21	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.8	1.9	1
Hexachlorobutadiene	ND		ug/kg	7.7	0.32	1
Isopropylbenzene	40		ug/kg	1.9	0.21	1
p-Isopropyltoluene	0.86	J	ug/kg	1.9	0.21	1
Naphthalene	6.2	J	ug/kg	7.7	1.2	1
Acrylonitrile	ND		ug/kg	7.7	2.2	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-04
Client ID: SB09_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	2.5		ug/kg	1.9	0.33	1
1,2,3-Trichlorobenzene	ND		ug/kg	3.8	0.62	1
1,2,4-Trichlorobenzene	ND		ug/kg	3.8	0.52	1
1,3,5-Trimethylbenzene	ND		ug/kg	3.8	0.37	1
1,2,4-Trimethylbenzene	1.3	J	ug/kg	3.8	0.64	1
1,4-Dioxane	ND		ug/kg	150	68.	1
p-Diethylbenzene	ND		ug/kg	3.8	0.34	1
p-Ethyltoluene	9.6		ug/kg	3.8	0.74	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	3.8	0.37	1
Ethyl ether	ND		ug/kg	3.8	0.66	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	9.6	2.7	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	130		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	278	Q	70-130
Dibromofluoromethane	115		70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 03/31/23 13:19
Analyst: JIC
Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	4.4	2.0	1
1,1-Dichloroethane	ND		ug/kg	0.88	0.13	1
Chloroform	ND		ug/kg	1.3	0.12	1
Carbon tetrachloride	ND		ug/kg	0.88	0.20	1
1,2-Dichloropropane	ND		ug/kg	0.88	0.11	1
Dibromochloromethane	ND		ug/kg	0.88	0.12	1
1,1,2-Trichloroethane	ND		ug/kg	0.88	0.23	1
Tetrachloroethene	ND		ug/kg	0.44	0.17	1
Chlorobenzene	ND		ug/kg	0.44	0.11	1
Trichlorofluoromethane	ND		ug/kg	3.5	0.61	1
1,2-Dichloroethane	ND		ug/kg	0.88	0.22	1
1,1,1-Trichloroethane	ND		ug/kg	0.44	0.15	1
Bromodichloromethane	ND		ug/kg	0.44	0.10	1
trans-1,3-Dichloropropene	ND		ug/kg	0.88	0.24	1
cis-1,3-Dichloropropene	ND		ug/kg	0.44	0.14	1
1,3-Dichloropropene, Total	ND		ug/kg	0.44	0.14	1
1,1-Dichloropropene	ND		ug/kg	0.44	0.14	1
Bromoform	ND		ug/kg	3.5	0.22	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.44	0.14	1
Benzene	ND		ug/kg	0.44	0.14	1
Toluene	ND		ug/kg	0.88	0.48	1
Ethylbenzene	ND		ug/kg	0.88	0.12	1
Chloromethane	ND		ug/kg	3.5	0.82	1
Bromomethane	ND		ug/kg	1.8	0.51	1
Vinyl chloride	ND		ug/kg	0.88	0.29	1
Chloroethane	ND		ug/kg	1.8	0.40	1
1,1-Dichloroethene	ND		ug/kg	0.88	0.21	1
trans-1,2-Dichloroethene	ND		ug/kg	1.3	0.12	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS****Lab ID:** L2316244-05**Date Collected:** 03/28/23 14:15**Client ID:** SB12_0-2**Date Received:** 03/28/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.44	0.12	1
1,2-Dichlorobenzene	ND		ug/kg	1.8	0.13	1
1,3-Dichlorobenzene	ND		ug/kg	1.8	0.13	1
1,4-Dichlorobenzene	ND		ug/kg	1.8	0.15	1
Methyl tert butyl ether	ND		ug/kg	1.8	0.18	1
p/m-Xylene	ND		ug/kg	1.8	0.49	1
o-Xylene	ND		ug/kg	0.88	0.26	1
Xylenes, Total	ND		ug/kg	0.88	0.26	1
cis-1,2-Dichloroethene	ND		ug/kg	0.88	0.15	1
1,2-Dichloroethene, Total	ND		ug/kg	0.88	0.12	1
Dibromomethane	ND		ug/kg	1.8	0.21	1
Styrene	ND		ug/kg	0.88	0.17	1
Dichlorodifluoromethane	ND		ug/kg	8.8	0.80	1
Acetone	5.4	J	ug/kg	8.8	4.2	1
Carbon disulfide	ND		ug/kg	8.8	4.0	1
2-Butanone	ND		ug/kg	8.8	1.9	1
Vinyl acetate	ND		ug/kg	8.8	1.9	1
4-Methyl-2-pentanone	ND		ug/kg	8.8	1.1	1
1,2,3-Trichloropropane	ND		ug/kg	1.8	0.11	1
2-Hexanone	ND		ug/kg	8.8	1.0	1
Bromochloromethane	ND		ug/kg	1.8	0.18	1
2,2-Dichloropropane	ND		ug/kg	1.8	0.18	1
1,2-Dibromoethane	ND		ug/kg	0.88	0.24	1
1,3-Dichloropropane	ND		ug/kg	1.8	0.15	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.44	0.12	1
Bromobenzene	ND		ug/kg	1.8	0.13	1
n-Butylbenzene	ND		ug/kg	0.88	0.15	1
sec-Butylbenzene	ND		ug/kg	0.88	0.13	1
tert-Butylbenzene	ND		ug/kg	1.8	0.10	1
o-Chlorotoluene	ND		ug/kg	1.8	0.17	1
p-Chlorotoluene	ND		ug/kg	1.8	0.10	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	2.6	0.88	1
Hexachlorobutadiene	ND		ug/kg	3.5	0.15	1
Isopropylbenzene	ND		ug/kg	0.88	0.10	1
p-Isopropyltoluene	ND		ug/kg	0.88	0.10	1
Naphthalene	ND		ug/kg	3.5	0.57	1
Acrylonitrile	ND		ug/kg	3.5	1.0	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	ND		ug/kg	0.88	0.15	1
1,2,3-Trichlorobenzene	ND		ug/kg	1.8	0.28	1
1,2,4-Trichlorobenzene	ND		ug/kg	1.8	0.24	1
1,3,5-Trimethylbenzene	ND		ug/kg	1.8	0.17	1
1,2,4-Trimethylbenzene	ND		ug/kg	1.8	0.29	1
1,4-Dioxane	ND		ug/kg	70	31.	1
p-Diethylbenzene	ND		ug/kg	1.8	0.16	1
p-Ethyltoluene	ND		ug/kg	1.8	0.34	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	1.8	0.17	1
Ethyl ether	ND		ug/kg	1.8	0.30	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	4.4	1.2	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	129		70-130
Toluene-d8	72		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	143	Q	70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-06
Client ID: SB12_13.5-15
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 03/31/23 18:05
Analyst: JIC
Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	390	180	1
1,1-Dichloroethane	ND		ug/kg	78	11.	1
Chloroform	ND		ug/kg	120	11.	1
Carbon tetrachloride	ND		ug/kg	78	18.	1
1,2-Dichloropropane	ND		ug/kg	78	9.8	1
Dibromochloromethane	ND		ug/kg	78	11.	1
1,1,2-Trichloroethane	ND		ug/kg	78	21.	1
Tetrachloroethene	ND		ug/kg	39	15.	1
Chlorobenzene	ND		ug/kg	39	9.9	1
Trichlorofluoromethane	ND		ug/kg	310	54.	1
1,2-Dichloroethane	ND		ug/kg	78	20.	1
1,1,1-Trichloroethane	ND		ug/kg	39	13.	1
Bromodichloromethane	ND		ug/kg	39	8.5	1
trans-1,3-Dichloropropene	ND		ug/kg	78	21.	1
cis-1,3-Dichloropropene	ND		ug/kg	39	12.	1
1,3-Dichloropropene, Total	ND		ug/kg	39	12.	1
1,1-Dichloropropene	ND		ug/kg	39	12.	1
Bromoform	ND		ug/kg	310	19.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	39	13.	1
Benzene	ND		ug/kg	39	13.	1
Toluene	ND		ug/kg	78	42.	1
Ethylbenzene	ND		ug/kg	78	11.	1
Chloromethane	ND		ug/kg	310	73.	1
Bromomethane	ND		ug/kg	160	45.	1
Vinyl chloride	ND		ug/kg	78	26.	1
Chloroethane	ND		ug/kg	160	35.	1
1,1-Dichloroethene	ND		ug/kg	78	19.	1
trans-1,2-Dichloroethene	ND		ug/kg	120	11.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-06
 Client ID: SB12_13.5-15
 Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35
 Date Received: 03/28/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	39	11.	1
1,2-Dichlorobenzene	ND		ug/kg	160	11.	1
1,3-Dichlorobenzene	ND		ug/kg	160	12.	1
1,4-Dichlorobenzene	ND		ug/kg	160	13.	1
Methyl tert butyl ether	ND		ug/kg	160	16.	1
p/m-Xylene	ND		ug/kg	160	44.	1
o-Xylene	31	J	ug/kg	78	23.	1
Xylenes, Total	31	J	ug/kg	78	23.	1
cis-1,2-Dichloroethene	ND		ug/kg	78	14.	1
1,2-Dichloroethene, Total	ND		ug/kg	78	11.	1
Dibromomethane	ND		ug/kg	160	19.	1
Styrene	ND		ug/kg	78	15.	1
Dichlorodifluoromethane	ND		ug/kg	780	72.	1
Acetone	ND		ug/kg	780	380	1
Carbon disulfide	ND		ug/kg	780	360	1
2-Butanone	ND		ug/kg	780	170	1
Vinyl acetate	ND		ug/kg	780	170	1
4-Methyl-2-pentanone	ND		ug/kg	780	100	1
1,2,3-Trichloropropane	ND		ug/kg	160	9.9	1
2-Hexanone	ND		ug/kg	780	92.	1
Bromochloromethane	ND		ug/kg	160	16.	1
2,2-Dichloropropane	ND		ug/kg	160	16.	1
1,2-Dibromoethane	ND		ug/kg	78	22.	1
1,3-Dichloropropane	ND		ug/kg	160	13.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	39	10.	1
Bromobenzene	ND		ug/kg	160	11.	1
n-Butylbenzene	ND		ug/kg	78	13.	1
sec-Butylbenzene	ND		ug/kg	78	11.	1
tert-Butylbenzene	ND		ug/kg	160	9.2	1
o-Chlorotoluene	ND		ug/kg	160	15.	1
p-Chlorotoluene	ND		ug/kg	160	8.4	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	230	78.	1
Hexachlorobutadiene	ND		ug/kg	310	13.	1
Isopropylbenzene	45	J	ug/kg	78	8.5	1
p-Isopropyltoluene	25	J	ug/kg	78	8.5	1
Naphthalene	3700		ug/kg	310	51.	1
Acrylonitrile	ND		ug/kg	310	90.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-06
Client ID: SB12_13.5-15
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	23	J	ug/kg	78	13.	1
1,2,3-Trichlorobenzene	ND		ug/kg	160	25.	1
1,2,4-Trichlorobenzene	ND		ug/kg	160	21.	1
1,3,5-Trimethylbenzene	ND		ug/kg	160	15.	1
1,2,4-Trimethylbenzene	26	J	ug/kg	160	26.	1
1,4-Dioxane	ND		ug/kg	6300	2700	1
p-Diethylbenzene	ND		ug/kg	160	14.	1
p-Ethyltoluene	50	J	ug/kg	160	30.	1
1,2,4,5-Tetramethylbenzene	18	J	ug/kg	160	15.	1
Ethyl ether	ND		ug/kg	160	27.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	390	110	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	89		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	116		70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 1,8260D
Analytical Date: 03/30/23 14:20
Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	ND		ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	98		70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-08
Client ID: TB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:25
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 1,8260D
Analytical Date: 03/30/23 14:47
Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-08
Client ID: TB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:25
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	ND		ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-08
Client ID: TB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:25
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	100		70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/30/23 09:04
 Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1761028-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	ND		ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/30/23 09:04
 Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1761028-5					
1,2-Dichlorobenzene	ND		ug/kg	2.0	0.14
1,3-Dichlorobenzene	ND		ug/kg	2.0	0.15
1,4-Dichlorobenzene	ND		ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	ND		ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	ND		ug/kg	2.0	0.14
n-Butylbenzene	ND		ug/kg	1.0	0.17
sec-Butylbenzene	ND		ug/kg	1.0	0.15
tert-Butylbenzene	ND		ug/kg	2.0	0.12
o-Chlorotoluene	ND		ug/kg	2.0	0.19

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/30/23 09:04
 Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1761028-5					
p-Chlorotoluene	ND		ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	ND		ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	0.18	J	ug/kg	1.0	0.11
Naphthalene	ND		ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	ND		ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	0.33	J	ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	ND		ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	ND		ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	136	Q	70-130
Toluene-d8	88		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	127		70-130



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/30/23 10:52
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07-08 Batch: WG1761259-5					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.14
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.07
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.17
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.18

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/30/23 10:52
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07-08 Batch: WG1761259-5					
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.5
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.9
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/30/23 10:52
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07-08 Batch: WG1761259-5					
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
1,4-Dioxane	ND		ug/l	250	61.
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	99		70-130

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/31/23 09:00
 Analyst: TMH

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 04-05 Batch: WG1762102-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	0.83	J	ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/31/23 09:00
 Analyst: TMH

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 04-05 Batch: WG1762102-5					
1,2-Dichlorobenzene	ND		ug/kg	2.0	0.14
1,3-Dichlorobenzene	ND		ug/kg	2.0	0.15
1,4-Dichlorobenzene	ND		ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	ND		ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	ND		ug/kg	2.0	0.14
n-Butylbenzene	ND		ug/kg	1.0	0.17
sec-Butylbenzene	ND		ug/kg	1.0	0.15
tert-Butylbenzene	ND		ug/kg	2.0	0.12
o-Chlorotoluene	ND		ug/kg	2.0	0.19

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/31/23 09:00
 Analyst: TMH

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 04-05 Batch: WG1762102-5					
p-Chlorotoluene	ND		ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	ND		ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	ND		ug/kg	1.0	0.11
Naphthalene	ND		ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	ND		ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	ND		ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	ND		ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	ND		ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	125		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	122		70-130



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/31/23 09:00
 Analyst: TMH

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 06 Batch: WG1762105-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	41	J	ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 03/31/23 09:00
 Analyst: TMH

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 06 Batch: WG1762105-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 03/31/23 09:00
Analyst: TMH

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 06 Batch: WG1762105-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	ND		ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	125		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	122		70-130



Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1761028-3 WG1761028-4								
Methylene chloride	90		91		70-130	1		30
1,1-Dichloroethane	88		91		70-130	3		30
Chloroform	89		92		70-130	3		30
Carbon tetrachloride	104		107		70-130	3		30
1,2-Dichloropropane	89		92		70-130	3		30
Dibromochloromethane	101		101		70-130	0		30
1,1,2-Trichloroethane	87		86		70-130	1		30
Tetrachloroethene	92		93		70-130	1		30
Chlorobenzene	98		102		70-130	4		30
Trichlorofluoromethane	97		101		70-139	4		30
1,2-Dichloroethane	95		95		70-130	0		30
1,1,1-Trichloroethane	103		105		70-130	2		30
Bromodichloromethane	93		94		70-130	1		30
trans-1,3-Dichloropropene	89		88		70-130	1		30
cis-1,3-Dichloropropene	98		100		70-130	2		30
1,1-Dichloropropene	96		99		70-130	3		30
Bromoform	96		94		70-130	2		30
1,1,2,2-Tetrachloroethane	103		96		70-130	7		30
Benzene	94		96		70-130	2		30
Toluene	96		98		70-130	2		30
Ethylbenzene	101		103		70-130	2		30
Chloromethane	74		76		52-130	3		30
Bromomethane	98		100		57-147	2		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1761028-3 WG1761028-4								
Vinyl chloride	78		79		67-130	1		30
Chloroethane	110		111		50-151	1		30
1,1-Dichloroethene	90		92		65-135	2		30
trans-1,2-Dichloroethene	90		96		70-130	6		30
Trichloroethene	103		106		70-130	3		30
1,2-Dichlorobenzene	98		105		70-130	7		30
1,3-Dichlorobenzene	106		106		70-130	0		30
1,4-Dichlorobenzene	101		103		70-130	2		30
Methyl tert butyl ether	92		92		66-130	0		30
p/m-Xylene	102		105		70-130	3		30
o-Xylene	102		105		70-130	3		30
cis-1,2-Dichloroethene	90		92		70-130	2		30
Dibromomethane	95		96		70-130	1		30
Styrene	107		109		70-130	2		30
Dichlorodifluoromethane	83		84		30-146	1		30
Acetone	104		100		54-140	4		30
Carbon disulfide	143	Q	147	Q	59-130	3		30
2-Butanone	113		97		70-130	15		30
Vinyl acetate	106		102		70-130	4		30
4-Methyl-2-pentanone	92		92		70-130	0		30
1,2,3-Trichloropropane	102		98		68-130	4		30
2-Hexanone	109		103		70-130	6		30
Bromochloromethane	96		98		70-130	2		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1761028-3 WG1761028-4								
2,2-Dichloropropane	95		102		70-130	7		30
1,2-Dibromoethane	92		91		70-130	1		30
1,3-Dichloropropane	92		91		69-130	1		30
1,1,1,2-Tetrachloroethane	99		101		70-130	2		30
Bromobenzene	105		104		70-130	1		30
n-Butylbenzene	109		113		70-130	4		30
sec-Butylbenzene	108		109		70-130	1		30
tert-Butylbenzene	109		112		70-130	3		30
o-Chlorotoluene	106		108		70-130	2		30
p-Chlorotoluene	109		108		70-130	1		30
1,2-Dibromo-3-chloropropane	89		96		68-130	8		30
Hexachlorobutadiene	93		93		67-130	0		30
Isopropylbenzene	109		109		70-130	0		30
p-Isopropyltoluene	112		114		70-130	2		30
Naphthalene	102		98		70-130	4		30
Acrylonitrile	100		100		70-130	0		30
n-Propylbenzene	110		110		70-130	0		30
1,2,3-Trichlorobenzene	96		91		70-130	5		30
1,2,4-Trichlorobenzene	102		100		70-130	2		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	104		106		70-130	2		30
1,4-Dioxane	105		101		65-136	4		30
p-Diethylbenzene	110		112		70-130	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1761028-3 WG1761028-4								
p-Ethyltoluene	109		108		70-130	1		30
1,2,4,5-Tetramethylbenzene	94		110		70-130	16		30
Ethyl ether	87		89		67-130	2		30
trans-1,4-Dichloro-2-butene	120		115		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	96		97		70-130
4-Bromofluorobenzene	105		100		70-130
Dibromofluoromethane	93		91		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1761259-3 WG1761259-4								
Methylene chloride	88		90		70-130	2		20
1,1-Dichloroethane	93		97		70-130	4		20
Chloroform	92		95		70-130	3		20
Carbon tetrachloride	92		96		63-132	4		20
1,2-Dichloropropane	92		94		70-130	2		20
Dibromochloromethane	86		90		63-130	5		20
1,1,2-Trichloroethane	89		94		70-130	5		20
Tetrachloroethene	94		98		70-130	4		20
Chlorobenzene	94		98		75-130	4		20
Trichlorofluoromethane	100		100		62-150	0		20
1,2-Dichloroethane	92		94		70-130	2		20
1,1,1-Trichloroethane	91		95		67-130	4		20
Bromodichloromethane	88		90		67-130	2		20
trans-1,3-Dichloropropene	89		92		70-130	3		20
cis-1,3-Dichloropropene	87		90		70-130	3		20
1,1-Dichloropropene	92		96		70-130	4		20
Bromoform	81		84		54-136	4		20
1,1,2,2-Tetrachloroethane	92		97		67-130	5		20
Benzene	93		96		70-130	3		20
Toluene	93		98		70-130	5		20
Ethylbenzene	94		98		70-130	4		20
Chloromethane	74		78		64-130	5		20
Bromomethane	61		67		39-139	9		20

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1761259-3 WG1761259-4								
Vinyl chloride	93		100		55-140	7		20
Chloroethane	100		110		55-138	10		20
1,1-Dichloroethene	99		100		61-145	1		20
trans-1,2-Dichloroethene	90		94		70-130	4		20
Trichloroethene	90		91		70-130	1		20
1,2-Dichlorobenzene	93		97		70-130	4		20
1,3-Dichlorobenzene	94		97		70-130	3		20
1,4-Dichlorobenzene	93		96		70-130	3		20
Methyl tert butyl ether	86		90		63-130	5		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	90		95		70-130	5		20
cis-1,2-Dichloroethene	90		96		70-130	6		20
Dibromomethane	88		92		70-130	4		20
1,2,3-Trichloropropane	88		92		64-130	4		20
Acrylonitrile	81		84		70-130	4		20
Styrene	90		95		70-130	5		20
Dichlorodifluoromethane	84		88		36-147	5		20
Acetone	86		87		58-148	1		20
Carbon disulfide	96		100		51-130	4		20
2-Butanone	78		86		63-138	10		20
Vinyl acetate	100		110		70-130	10		20
4-Methyl-2-pentanone	80		84		59-130	5		20
2-Hexanone	79		84		57-130	6		20

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1761259-3 WG1761259-4								
Bromochloromethane	90		93		70-130	3		20
2,2-Dichloropropane	94		98		63-133	4		20
1,2-Dibromoethane	90		94		70-130	4		20
1,3-Dichloropropane	92		96		70-130	4		20
1,1,1,2-Tetrachloroethane	89		94		64-130	5		20
Bromobenzene	95		97		70-130	2		20
n-Butylbenzene	94		98		53-136	4		20
sec-Butylbenzene	93		97		70-130	4		20
tert-Butylbenzene	93		98		70-130	5		20
o-Chlorotoluene	95		100		70-130	5		20
p-Chlorotoluene	94		98		70-130	4		20
1,2-Dibromo-3-chloropropane	76		82		41-144	8		20
Hexachlorobutadiene	91		98		63-130	7		20
Isopropylbenzene	94		98		70-130	4		20
p-Isopropyltoluene	93		97		70-130	4		20
Naphthalene	83		90		70-130	8		20
n-Propylbenzene	95		99		69-130	4		20
1,2,3-Trichlorobenzene	87		94		70-130	8		20
1,2,4-Trichlorobenzene	90		94		70-130	4		20
1,3,5-Trimethylbenzene	93		97		64-130	4		20
1,2,4-Trimethylbenzene	93		97		70-130	4		20
1,4-Dioxane	72		82		56-162	13		20
p-Diethylbenzene	91		96		70-130	5		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1761259-3 WG1761259-4								
p-Ethyltoluene	94		97		70-130	3		20
1,2,4,5-Tetramethylbenzene	90		94		70-130	4		20
Ethyl ether	90		100		59-134	11		20
trans-1,4-Dichloro-2-butene	83		88		70-130	6		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	100		100		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	101		100		70-130
Dibromofluoromethane	100		100		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 04-05 Batch: WG1762102-3 WG1762102-4								
Methylene chloride	106		107		70-130	1		30
1,1-Dichloroethane	103		103		70-130	0		30
Chloroform	94		103		70-130	9		30
Carbon tetrachloride	105		113		70-130	7		30
1,2-Dichloropropane	93		92		70-130	1		30
Dibromochloromethane	103		127		70-130	21		30
1,1,2-Trichloroethane	90		108		70-130	18		30
Tetrachloroethene	94		112		70-130	17		30
Chlorobenzene	104		103		70-130	1		30
Trichlorofluoromethane	106		110		70-139	4		30
1,2-Dichloroethane	87		88		70-130	1		30
1,1,1-Trichloroethane	100		112		70-130	11		30
Bromodichloromethane	81		94		70-130	15		30
trans-1,3-Dichloropropene	87		110		70-130	23		30
cis-1,3-Dichloropropene	100		116		70-130	15		30
1,1-Dichloropropene	97		99		70-130	2		30
Bromoform	106		104		70-130	2		30
1,1,2,2-Tetrachloroethane	93		87		70-130	7		30
Benzene	96		87		70-130	10		30
Toluene	86		111		70-130	25		30
Ethylbenzene	104		106		70-130	2		30
Chloromethane	87		86		52-130	1		30
Bromomethane	109		110		57-147	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 04-05 Batch: WG1762102-3 WG1762102-4								
Vinyl chloride	94		91		67-130	3		30
Chloroethane	112		118		50-151	5		30
1,1-Dichloroethene	109		104		65-135	5		30
trans-1,2-Dichloroethene	110		108		70-130	2		30
Trichloroethene	98		107		70-130	9		30
1,2-Dichlorobenzene	101		119		70-130	16		30
1,3-Dichlorobenzene	109		110		70-130	1		30
1,4-Dichlorobenzene	107		105		70-130	2		30
Methyl tert butyl ether	109		108		66-130	1		30
p/m-Xylene	108		114		70-130	5		30
o-Xylene	116		110		70-130	5		30
cis-1,2-Dichloroethene	105		112		70-130	6		30
Dibromomethane	94		90		70-130	4		30
Styrene	120		119		70-130	1		30
Dichlorodifluoromethane	97		94		30-146	3		30
Acetone	115		101		54-140	13		30
Carbon disulfide	171	Q	167	Q	59-130	2		30
2-Butanone	101		110		70-130	9		30
Vinyl acetate	121		116		70-130	4		30
4-Methyl-2-pentanone	87		115		70-130	28		30
1,2,3-Trichloropropane	88		88		68-130	0		30
2-Hexanone	97		100		70-130	3		30
Bromochloromethane	103		115		70-130	11		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 04-05 Batch: WG1762102-3 WG1762102-4								
2,2-Dichloropropane	101		112		70-130	10		30
1,2-Dibromoethane	87		106		70-130	20		30
1,3-Dichloropropane	96		115		69-130	18		30
1,1,1,2-Tetrachloroethane	108		110		70-130	2		30
Bromobenzene	110		96		70-130	14		30
n-Butylbenzene	108		111		70-130	3		30
sec-Butylbenzene	111		108		70-130	3		30
tert-Butylbenzene	110		111		70-130	1		30
o-Chlorotoluene	103		96		70-130	7		30
p-Chlorotoluene	95		97		70-130	2		30
1,2-Dibromo-3-chloropropane	88		121		68-130	32	Q	30
Hexachlorobutadiene	90		112		67-130	22		30
Isopropylbenzene	123		95		70-130	26		30
p-Isopropyltoluene	116		115		70-130	1		30
Naphthalene	91		129		70-130	35	Q	30
Acrylonitrile	113		116		70-130	3		30
n-Propylbenzene	112		95		70-130	16		30
1,2,3-Trichlorobenzene	91		124		70-130	31	Q	30
1,2,4-Trichlorobenzene	95		127		70-130	29		30
1,3,5-Trimethylbenzene	102		94		70-130	8		30
1,2,4-Trimethylbenzene	105		107		70-130	2		30
1,4-Dioxane	87		114		65-136	27		30
p-Diethylbenzene	111		100		70-130	10		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 04-05 Batch: WG1762102-3 WG1762102-4								
p-Ethyltoluene	107		96		70-130	11		30
1,2,4,5-Tetramethylbenzene	97		133	Q	70-130	31	Q	30
Ethyl ether	105		106		67-130	1		30
trans-1,4-Dichloro-2-butene	102		99		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	86		92		70-130
Toluene-d8	90		118		70-130
4-Bromofluorobenzene	107		91		70-130
Dibromofluoromethane	90		103		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 06 Batch: WG1762105-3 WG1762105-4								
Methylene chloride	106		107		70-130	1		30
1,1-Dichloroethane	103		103		70-130	0		30
Chloroform	94		103		70-130	9		30
Carbon tetrachloride	105		113		70-130	7		30
1,2-Dichloropropane	93		92		70-130	1		30
Dibromochloromethane	103		127		70-130	21		30
1,1,2-Trichloroethane	90		108		70-130	18		30
Tetrachloroethene	94		112		70-130	17		30
Chlorobenzene	104		103		70-130	1		30
Trichlorofluoromethane	106		110		70-139	4		30
1,2-Dichloroethane	87		88		70-130	1		30
1,1,1-Trichloroethane	100		112		70-130	11		30
Bromodichloromethane	81		94		70-130	15		30
trans-1,3-Dichloropropene	87		110		70-130	23		30
cis-1,3-Dichloropropene	100		116		70-130	15		30
1,1-Dichloropropene	97		99		70-130	2		30
Bromoform	106		104		70-130	2		30
1,1,2,2-Tetrachloroethane	93		87		70-130	7		30
Benzene	96		87		70-130	10		30
Toluene	86		111		70-130	25		30
Ethylbenzene	104		106		70-130	2		30
Chloromethane	87		86		52-130	1		30
Bromomethane	109		110		57-147	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 06 Batch: WG1762105-3 WG1762105-4								
Vinyl chloride	94		91		67-130	3		30
Chloroethane	112		118		50-151	5		30
1,1-Dichloroethene	109		104		65-135	5		30
trans-1,2-Dichloroethene	110		108		70-130	2		30
Trichloroethene	98		107		70-130	9		30
1,2-Dichlorobenzene	101		119		70-130	16		30
1,3-Dichlorobenzene	109		110		70-130	1		30
1,4-Dichlorobenzene	107		105		70-130	2		30
Methyl tert butyl ether	109		108		66-130	1		30
p/m-Xylene	108		114		70-130	5		30
o-Xylene	116		110		70-130	5		30
cis-1,2-Dichloroethene	105		112		70-130	6		30
Dibromomethane	94		90		70-130	4		30
Styrene	120		119		70-130	1		30
Dichlorodifluoromethane	97		94		30-146	3		30
Acetone	115		101		54-140	13		30
Carbon disulfide	171	Q	167	Q	59-130	2		30
2-Butanone	101		110		70-130	9		30
Vinyl acetate	121		116		70-130	4		30
4-Methyl-2-pentanone	87		115		70-130	28		30
1,2,3-Trichloropropane	88		88		68-130	0		30
2-Hexanone	97		100		70-130	3		30
Bromochloromethane	103		115		70-130	11		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 06 Batch: WG1762105-3 WG1762105-4								
2,2-Dichloropropane	101		112		70-130	10		30
1,2-Dibromoethane	87		106		70-130	20		30
1,3-Dichloropropane	96		115		69-130	18		30
1,1,1,2-Tetrachloroethane	108		110		70-130	2		30
Bromobenzene	110		96		70-130	14		30
n-Butylbenzene	108		111		70-130	3		30
sec-Butylbenzene	111		108		70-130	3		30
tert-Butylbenzene	110		111		70-130	1		30
o-Chlorotoluene	103		96		70-130	7		30
p-Chlorotoluene	95		97		70-130	2		30
1,2-Dibromo-3-chloropropane	88		121		68-130	32	Q	30
Hexachlorobutadiene	90		112		67-130	22		30
Isopropylbenzene	123		95		70-130	26		30
p-Isopropyltoluene	116		115		70-130	1		30
Naphthalene	91		129		70-130	35	Q	30
Acrylonitrile	113		116		70-130	3		30
n-Propylbenzene	112		95		70-130	16		30
1,2,3-Trichlorobenzene	91		124		70-130	31	Q	30
1,2,4-Trichlorobenzene	95		127		70-130	29		30
1,3,5-Trimethylbenzene	102		94		70-130	8		30
1,2,4-Trimethylbenzene	105		107		70-130	2		30
1,4-Dioxane	87		114		65-136	27		30
p-Diethylbenzene	111		100		70-130	10		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 06 Batch: WG1762105-3 WG1762105-4								
p-Ethyltoluene	107		96		70-130	11		30
1,2,4,5-Tetramethylbenzene	97		133	Q	70-130	31	Q	30
Ethyl ether	105		106		67-130	1		30
trans-1,4-Dichloro-2-butene	102		99		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	86		92		70-130
Toluene-d8	90		118		70-130
4-Bromofluorobenzene	107		91		70-130
Dibromofluoromethane	90		103		70-130

SEMIVOLATILES

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-01
 Client ID: SB08_0-2
 Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
 Date Received: 03/28/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 03/31/23 18:52
 Analyst: JG
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	140	19.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	21.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	25.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
1,2-Dichlorobenzene	ND		ug/kg	180	33.	1
1,3-Dichlorobenzene	ND		ug/kg	180	31.	1
1,4-Dichlorobenzene	ND		ug/kg	180	32.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	36.	1
2,6-Dinitrotoluene	ND		ug/kg	180	31.	1
Fluoranthene	140		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	31.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	18.	1
Hexachlorobutadiene	ND		ug/kg	180	27.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	160	1
Hexachloroethane	ND		ug/kg	140	29.	1
Isophorone	ND		ug/kg	160	24.	1
Naphthalene	170	J	ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	27.	1
NDPA/DPA	ND		ug/kg	140	21.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	28.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	63.	1
Butyl benzyl phthalate	ND		ug/kg	180	46.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	62.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS****Lab ID:** L2316244-01**Date Collected:** 03/28/23 15:20**Client ID:** SB08_0-2**Date Received:** 03/28/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	17.	1
Dimethyl phthalate	ND		ug/kg	180	38.	1
Benzo(a)anthracene	100	J	ug/kg	110	20.	1
Benzo(a)pyrene	93	J	ug/kg	140	44.	1
Benzo(b)fluoranthene	80	J	ug/kg	110	31.	1
Benzo(k)fluoranthene	ND		ug/kg	110	29.	1
Chrysene	110		ug/kg	110	19.	1
Acenaphthylene	45	J	ug/kg	140	28.	1
Anthracene	65	J	ug/kg	110	35.	1
Benzo(ghi)perylene	49	J	ug/kg	140	21.	1
Fluorene	91	J	ug/kg	180	18.	1
Phenanthrene	310		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	44	J	ug/kg	140	25.	1
Pyrene	210		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	420	24.	1
4-Chloroaniline	ND		ug/kg	180	33.	1
2-Nitroaniline	ND		ug/kg	180	35.	1
3-Nitroaniline	ND		ug/kg	180	34.	1
4-Nitroaniline	ND		ug/kg	180	75.	1
Dibenzofuran	ND		ug/kg	180	17.	1
2-Methylnaphthalene	120	J	ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	27.	1
2-Chlorophenol	ND		ug/kg	180	22.	1
2,4-Dichlorophenol	ND		ug/kg	160	29.	1
2,4-Dimethylphenol	ND		ug/kg	180	60.	1
2-Nitrophenol	ND		ug/kg	390	68.	1
4-Nitrophenol	ND		ug/kg	250	74.	1
2,4-Dinitrophenol	ND		ug/kg	870	85.	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	87.	1
Pentachlorophenol	ND		ug/kg	140	40.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	28.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	28.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01
Client ID: SB08_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	35.	1
Benzoic Acid	ND		ug/kg	590	180	1
Benzyl Alcohol	ND		ug/kg	180	56.	1
Carbazole	ND		ug/kg	180	18.	1
1,4-Dioxane	ND		ug/kg	27	8.4	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	48		25-120
Phenol-d6	51		10-120
Nitrobenzene-d5	48		23-120
2-Fluorobiphenyl	51		30-120
2,4,6-Tribromophenol	67		10-136
4-Terphenyl-d14	46		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-02
Client ID: SB08_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:10
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 19:16
Analyst: JG
Percent Solids: 66%

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	610		ug/kg	200	26.	1
1,2,4-Trichlorobenzene	ND		ug/kg	250	28.	1
Hexachlorobenzene	ND		ug/kg	150	28.	1
Bis(2-chloroethyl)ether	ND		ug/kg	220	34.	1
2-Chloronaphthalene	ND		ug/kg	250	25.	1
1,2-Dichlorobenzene	ND		ug/kg	250	45.	1
1,3-Dichlorobenzene	ND		ug/kg	250	43.	1
1,4-Dichlorobenzene	ND		ug/kg	250	43.	1
3,3'-Dichlorobenzidine	ND		ug/kg	250	66.	1
2,4-Dinitrotoluene	ND		ug/kg	250	50.	1
2,6-Dinitrotoluene	ND		ug/kg	250	43.	1
Fluoranthene	4400		ug/kg	150	28.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	250	26.	1
4-Bromophenyl phenyl ether	ND		ug/kg	250	38.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	300	42.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	270	25.	1
Hexachlorobutadiene	ND		ug/kg	250	36.	1
Hexachlorocyclopentadiene	ND		ug/kg	710	220	1
Hexachloroethane	ND		ug/kg	200	40.	1
Isophorone	ND		ug/kg	220	32.	1
Naphthalene	6100		ug/kg	250	30.	1
Nitrobenzene	ND		ug/kg	220	37.	1
NDPA/DPA	ND		ug/kg	200	28.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	250	38.	1
Bis(2-ethylhexyl)phthalate	630		ug/kg	250	86.	1
Butyl benzyl phthalate	4100		ug/kg	250	63.	1
Di-n-butylphthalate	ND		ug/kg	250	47.	1
Di-n-octylphthalate	ND		ug/kg	250	84.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-02
Client ID: SB08_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:10
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	250	23.	1
Dimethyl phthalate	ND		ug/kg	250	52.	1
Benzo(a)anthracene	2400		ug/kg	150	28.	1
Benzo(a)pyrene	2200		ug/kg	200	61.	1
Benzo(b)fluoranthene	2200		ug/kg	150	42.	1
Benzo(k)fluoranthene	660		ug/kg	150	40.	1
Chrysene	2400		ug/kg	150	26.	1
Acenaphthylene	1400		ug/kg	200	38.	1
Anthracene	1700		ug/kg	150	48.	1
Benzo(ghi)perylene	1300		ug/kg	200	29.	1
Fluorene	1500		ug/kg	250	24.	1
Phenanthrene	6200		ug/kg	150	30.	1
Dibenzo(a,h)anthracene	280		ug/kg	150	29.	1
Indeno(1,2,3-cd)pyrene	1300		ug/kg	200	35.	1
Pyrene	5500		ug/kg	150	25.	1
Biphenyl	350	J	ug/kg	570	32.	1
4-Chloroaniline	ND		ug/kg	250	45.	1
2-Nitroaniline	ND		ug/kg	250	48.	1
3-Nitroaniline	ND		ug/kg	250	47.	1
4-Nitroaniline	ND		ug/kg	250	100	1
Dibenzofuran	280		ug/kg	250	24.	1
2-Methylnaphthalene	2400		ug/kg	300	30.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	250	26.	1
Acetophenone	200	J	ug/kg	250	31.	1
2,4,6-Trichlorophenol	ND		ug/kg	150	47.	1
p-Chloro-m-cresol	ND		ug/kg	250	37.	1
2-Chlorophenol	ND		ug/kg	250	29.	1
2,4-Dichlorophenol	ND		ug/kg	220	40.	1
2,4-Dimethylphenol	ND		ug/kg	250	82.	1
2-Nitrophenol	ND		ug/kg	540	93.	1
4-Nitrophenol	ND		ug/kg	350	100	1
2,4-Dinitrophenol	ND		ug/kg	1200	120	1
4,6-Dinitro-o-cresol	ND		ug/kg	650	120	1
Pentachlorophenol	ND		ug/kg	200	55.	1
Phenol	ND		ug/kg	250	38.	1
2-Methylphenol	ND		ug/kg	250	38.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	360	39.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-02
Client ID: SB08_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:10
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	250	48.	1
Benzoic Acid	ND		ug/kg	800	250	1
Benzyl Alcohol	ND		ug/kg	250	76.	1
Carbazole	180	J	ug/kg	250	24.	1
1,4-Dioxane	ND		ug/kg	37	11.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	59		25-120
Phenol-d6	60		10-120
Nitrobenzene-d5	51		23-120
2-Fluorobiphenyl	54		30-120
2,4,6-Tribromophenol	66		10-136
4-Terphenyl-d14	35		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-03
Client ID: SB09_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:05
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 19:40
Analyst: JG
Percent Solids: 91%

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	140	19.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	21.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	24.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
1,2-Dichlorobenzene	ND		ug/kg	180	32.	1
1,3-Dichlorobenzene	ND		ug/kg	180	31.	1
1,4-Dichlorobenzene	ND		ug/kg	180	32.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	36.	1
2,6-Dinitrotoluene	ND		ug/kg	180	31.	1
Fluoranthene	210		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	31.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	160	1
Hexachloroethane	ND		ug/kg	140	29.	1
Isophorone	ND		ug/kg	160	23.	1
Naphthalene	ND		ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	27.	1
NDPA/DPA	ND		ug/kg	140	20.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	28.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	62.	1
Butyl benzyl phthalate	ND		ug/kg	180	46.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	62.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS****Lab ID:** L2316244-03**Date Collected:** 03/28/23 12:05**Client ID:** SB09_2-4**Date Received:** 03/28/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	17.	1
Dimethyl phthalate	ND		ug/kg	180	38.	1
Benzo(a)anthracene	110		ug/kg	110	20.	1
Benzo(a)pyrene	110	J	ug/kg	140	44.	1
Benzo(b)fluoranthene	120		ug/kg	110	30.	1
Benzo(k)fluoranthene	42	J	ug/kg	110	29.	1
Chrysene	110		ug/kg	110	19.	1
Acenaphthylene	ND		ug/kg	140	28.	1
Anthracene	35	J	ug/kg	110	35.	1
Benzo(ghi)perylene	66	J	ug/kg	140	21.	1
Fluorene	ND		ug/kg	180	18.	1
Phenanthrene	120		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	73	J	ug/kg	140	25.	1
Pyrene	200		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	410	24.	1
4-Chloroaniline	ND		ug/kg	180	33.	1
2-Nitroaniline	ND		ug/kg	180	35.	1
3-Nitroaniline	ND		ug/kg	180	34.	1
4-Nitroaniline	ND		ug/kg	180	75.	1
Dibenzofuran	ND		ug/kg	180	17.	1
2-Methylnaphthalene	ND		ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	27.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	29.	1
2,4-Dimethylphenol	ND		ug/kg	180	60.	1
2-Nitrophenol	ND		ug/kg	390	68.	1
4-Nitrophenol	ND		ug/kg	250	74.	1
2,4-Dinitrophenol	ND		ug/kg	870	84.	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	87.	1
Pentachlorophenol	ND		ug/kg	140	40.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	28.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	28.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-03
Client ID: SB09_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:05
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	35.	1
Benzoic Acid	ND		ug/kg	590	180	1
Benzyl Alcohol	ND		ug/kg	180	55.	1
Carbazole	ND		ug/kg	180	18.	1
1,4-Dioxane	ND		ug/kg	27	8.3	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	64		25-120
Phenol-d6	64		10-120
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	64		30-120
2,4,6-Tribromophenol	76		10-136
4-Terphenyl-d14	51		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-04
Client ID: SB09_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 20:04
Analyst: JG
Percent Solids: 75%

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	120	J	ug/kg	180	23.	1
1,2,4-Trichlorobenzene	ND		ug/kg	220	25.	1
Hexachlorobenzene	ND		ug/kg	130	25.	1
Bis(2-chloroethyl)ether	ND		ug/kg	200	30.	1
2-Chloronaphthalene	ND		ug/kg	220	22.	1
1,2-Dichlorobenzene	ND		ug/kg	220	40.	1
1,3-Dichlorobenzene	ND		ug/kg	220	38.	1
1,4-Dichlorobenzene	ND		ug/kg	220	39.	1
3,3'-Dichlorobenzidine	ND		ug/kg	220	59.	1
2,4-Dinitrotoluene	ND		ug/kg	220	44.	1
2,6-Dinitrotoluene	ND		ug/kg	220	38.	1
Fluoranthene	290		ug/kg	130	25.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	220	24.	1
4-Bromophenyl phenyl ether	ND		ug/kg	220	34.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	270	38.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	240	22.	1
Hexachlorobutadiene	ND		ug/kg	220	32.	1
Hexachlorocyclopentadiene	ND		ug/kg	630	200	1
Hexachloroethane	ND		ug/kg	180	36.	1
Isophorone	ND		ug/kg	200	29.	1
Naphthalene	330		ug/kg	220	27.	1
Nitrobenzene	ND		ug/kg	200	33.	1
NDPA/DPA	ND		ug/kg	180	25.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	220	34.	1
Bis(2-ethylhexyl)phthalate	4000		ug/kg	220	77.	1
Butyl benzyl phthalate	750		ug/kg	220	56.	1
Di-n-butylphthalate	ND		ug/kg	220	42.	1
Di-n-octylphthalate	570		ug/kg	220	75.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-04
 Client ID: SB09_12-13.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
 Date Received: 03/28/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	220	20.	1
Dimethyl phthalate	ND		ug/kg	220	46.	1
Benzo(a)anthracene	130		ug/kg	130	25.	1
Benzo(a)pyrene	78	J	ug/kg	180	54.	1
Benzo(b)fluoranthene	87	J	ug/kg	130	37.	1
Benzo(k)fluoranthene	ND		ug/kg	130	35.	1
Chrysene	160		ug/kg	130	23.	1
Acenaphthylene	130	J	ug/kg	180	34.	1
Anthracene	190		ug/kg	130	43.	1
Benzo(ghi)perylene	56	J	ug/kg	180	26.	1
Fluorene	160	J	ug/kg	220	22.	1
Phenanthrene	340		ug/kg	130	27.	1
Dibenzo(a,h)anthracene	ND		ug/kg	130	26.	1
Indeno(1,2,3-cd)pyrene	49	J	ug/kg	180	31.	1
Pyrene	430		ug/kg	130	22.	1
Biphenyl	73	J	ug/kg	500	29.	1
4-Chloroaniline	ND		ug/kg	220	40.	1
2-Nitroaniline	ND		ug/kg	220	43.	1
3-Nitroaniline	ND		ug/kg	220	42.	1
4-Nitroaniline	ND		ug/kg	220	92.	1
Dibenzofuran	58	J	ug/kg	220	21.	1
2-Methylnaphthalene	230	J	ug/kg	270	27.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	220	23.	1
Acetophenone	ND		ug/kg	220	27.	1
2,4,6-Trichlorophenol	ND		ug/kg	130	42.	1
p-Chloro-m-cresol	ND		ug/kg	220	33.	1
2-Chlorophenol	ND		ug/kg	220	26.	1
2,4-Dichlorophenol	ND		ug/kg	200	36.	1
2,4-Dimethylphenol	ND		ug/kg	220	73.	1
2-Nitrophenol	ND		ug/kg	480	83.	1
4-Nitrophenol	ND		ug/kg	310	90.	1
2,4-Dinitrophenol	ND		ug/kg	1100	100	1
4,6-Dinitro-o-cresol	ND		ug/kg	580	110	1
Pentachlorophenol	ND		ug/kg	180	49.	1
Phenol	ND		ug/kg	220	34.	1
2-Methylphenol	ND		ug/kg	220	34.	1
3-Methylphenol/4-Methylphenol	51	J	ug/kg	320	35.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-04
Client ID: SB09_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	220	42.	1
Benzoic Acid	ND		ug/kg	720	220	1
Benzyl Alcohol	ND		ug/kg	220	68.	1
Carbazole	ND		ug/kg	220	22.	1
1,4-Dioxane	ND		ug/kg	33	10.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	56		25-120
Phenol-d6	59		10-120
Nitrobenzene-d5	69		23-120
2-Fluorobiphenyl	70		30-120
2,4,6-Tribromophenol	67		10-136
4-Terphenyl-d14	54		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 20:28
Analyst: JG
Percent Solids: 90%

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	140	19.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	21.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	25.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
1,2-Dichlorobenzene	ND		ug/kg	180	32.	1
1,3-Dichlorobenzene	ND		ug/kg	180	31.	1
1,4-Dichlorobenzene	ND		ug/kg	180	32.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	36.	1
2,6-Dinitrotoluene	ND		ug/kg	180	31.	1
Fluoranthene	ND		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	31.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	160	1
Hexachloroethane	ND		ug/kg	140	29.	1
Isophorone	ND		ug/kg	160	24.	1
Naphthalene	ND		ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	27.	1
NDPA/DPA	ND		ug/kg	140	21.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	28.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	63.	1
Butyl benzyl phthalate	ND		ug/kg	180	46.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	62.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS****Lab ID:** L2316244-05**Date Collected:** 03/28/23 14:15**Client ID:** SB12_0-2**Date Received:** 03/28/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	17.	1
Dimethyl phthalate	ND		ug/kg	180	38.	1
Benzo(a)anthracene	ND		ug/kg	110	20.	1
Benzo(a)pyrene	ND		ug/kg	140	44.	1
Benzo(b)fluoranthene	ND		ug/kg	110	30.	1
Benzo(k)fluoranthene	ND		ug/kg	110	29.	1
Chrysene	ND		ug/kg	110	19.	1
Acenaphthylene	ND		ug/kg	140	28.	1
Anthracene	ND		ug/kg	110	35.	1
Benzo(ghi)perylene	ND		ug/kg	140	21.	1
Fluorene	ND		ug/kg	180	18.	1
Phenanthrene	ND		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	ND		ug/kg	140	25.	1
Pyrene	ND		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	410	24.	1
4-Chloroaniline	ND		ug/kg	180	33.	1
2-Nitroaniline	ND		ug/kg	180	35.	1
3-Nitroaniline	ND		ug/kg	180	34.	1
4-Nitroaniline	ND		ug/kg	180	75.	1
Dibenzofuran	ND		ug/kg	180	17.	1
2-Methylnaphthalene	ND		ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	27.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	29.	1
2,4-Dimethylphenol	ND		ug/kg	180	60.	1
2-Nitrophenol	ND		ug/kg	390	68.	1
4-Nitrophenol	ND		ug/kg	250	74.	1
2,4-Dinitrophenol	ND		ug/kg	870	84.	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	87.	1
Pentachlorophenol	ND		ug/kg	140	40.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	28.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	28.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	35.	1
Benzoic Acid	ND		ug/kg	590	180	1
Benzyl Alcohol	ND		ug/kg	180	56.	1
Carbazole	ND		ug/kg	180	18.	1
1,4-Dioxane	ND		ug/kg	27	8.3	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	60		25-120
Phenol-d6	62		10-120
Nitrobenzene-d5	59		23-120
2-Fluorobiphenyl	65		30-120
2,4,6-Tribromophenol	75		10-136
4-Terphenyl-d14	59		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-06
Client ID: SB12_13.5-15
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8270E
Analytical Date: 03/31/23 20:52
Analyst: JG
Percent Solids: 75%

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	29	J	ug/kg	180	23.	1
1,2,4-Trichlorobenzene	ND		ug/kg	220	25.	1
Hexachlorobenzene	ND		ug/kg	130	25.	1
Bis(2-chloroethyl)ether	ND		ug/kg	200	30.	1
2-Chloronaphthalene	ND		ug/kg	220	22.	1
1,2-Dichlorobenzene	ND		ug/kg	220	40.	1
1,3-Dichlorobenzene	ND		ug/kg	220	38.	1
1,4-Dichlorobenzene	ND		ug/kg	220	39.	1
3,3'-Dichlorobenzidine	ND		ug/kg	220	59.	1
2,4-Dinitrotoluene	ND		ug/kg	220	44.	1
2,6-Dinitrotoluene	ND		ug/kg	220	38.	1
Fluoranthene	72	J	ug/kg	130	25.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	220	24.	1
4-Bromophenyl phenyl ether	ND		ug/kg	220	34.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	260	38.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	240	22.	1
Hexachlorobutadiene	ND		ug/kg	220	32.	1
Hexachlorocyclopentadiene	ND		ug/kg	630	200	1
Hexachloroethane	ND		ug/kg	180	36.	1
Isophorone	ND		ug/kg	200	29.	1
Naphthalene	1900		ug/kg	220	27.	1
Nitrobenzene	ND		ug/kg	200	33.	1
NDPA/DPA	ND		ug/kg	180	25.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	220	34.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	220	76.	1
Butyl benzyl phthalate	ND		ug/kg	220	56.	1
Di-n-butylphthalate	ND		ug/kg	220	42.	1
Di-n-octylphthalate	ND		ug/kg	220	75.	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-06
 Client ID: SB12_13.5-15
 Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35
 Date Received: 03/28/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	220	20.	1
Dimethyl phthalate	ND		ug/kg	220	46.	1
Benzo(a)anthracene	26	J	ug/kg	130	25.	1
Benzo(a)pyrene	ND		ug/kg	180	54.	1
Benzo(b)fluoranthene	ND		ug/kg	130	37.	1
Benzo(k)fluoranthene	ND		ug/kg	130	35.	1
Chrysene	ND		ug/kg	130	23.	1
Acenaphthylene	ND		ug/kg	180	34.	1
Anthracene	ND		ug/kg	130	43.	1
Benzo(ghi)perylene	ND		ug/kg	180	26.	1
Fluorene	42	J	ug/kg	220	22.	1
Phenanthrene	120	J	ug/kg	130	27.	1
Dibenzo(a,h)anthracene	ND		ug/kg	130	26.	1
Indeno(1,2,3-cd)pyrene	ND		ug/kg	180	31.	1
Pyrene	63	J	ug/kg	130	22.	1
Biphenyl	ND		ug/kg	500	29.	1
4-Chloroaniline	ND		ug/kg	220	40.	1
2-Nitroaniline	ND		ug/kg	220	43.	1
3-Nitroaniline	ND		ug/kg	220	42.	1
4-Nitroaniline	ND		ug/kg	220	92.	1
Dibenzofuran	ND		ug/kg	220	21.	1
2-Methylnaphthalene	ND		ug/kg	260	27.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	220	23.	1
Acetophenone	ND		ug/kg	220	27.	1
2,4,6-Trichlorophenol	ND		ug/kg	130	42.	1
p-Chloro-m-cresol	ND		ug/kg	220	33.	1
2-Chlorophenol	ND		ug/kg	220	26.	1
2,4-Dichlorophenol	ND		ug/kg	200	36.	1
2,4-Dimethylphenol	ND		ug/kg	220	73.	1
2-Nitrophenol	ND		ug/kg	480	83.	1
4-Nitrophenol	ND		ug/kg	310	90.	1
2,4-Dinitrophenol	ND		ug/kg	1100	100	1
4,6-Dinitro-o-cresol	ND		ug/kg	580	110	1
Pentachlorophenol	ND		ug/kg	180	49.	1
Phenol	ND		ug/kg	220	33.	1
2-Methylphenol	ND		ug/kg	220	34.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	320	35.	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-06
Client ID: SB12_13.5-15
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	220	42.	1
Benzoic Acid	ND		ug/kg	720	220	1
Benzyl Alcohol	ND		ug/kg	220	68.	1
Carbazole	ND		ug/kg	220	22.	1
1,4-Dioxane	ND		ug/kg	33	10.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	69		25-120
Phenol-d6	69		10-120
Nitrobenzene-d5	69		23-120
2-Fluorobiphenyl	71		30-120
2,4,6-Tribromophenol	83		10-136
4-Terphenyl-d14	55		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:47
Analyst: CMM

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 16:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50	1
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50	1
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45	1
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40	1
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6	1
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2	1
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50	1
Hexachlorocyclopentadiene	ND		ug/l	20	0.69	1
Isophorone	ND		ug/l	5.0	1.2	1
Nitrobenzene	ND		ug/l	2.0	0.77	1
NDPA/DPA	ND		ug/l	2.0	0.42	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.5	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.2	1
Di-n-butylphthalate	ND		ug/l	5.0	0.39	1
Di-n-octylphthalate	ND		ug/l	5.0	1.3	1
Diethyl phthalate	ND		ug/l	5.0	0.38	1
Dimethyl phthalate	ND		ug/l	5.0	1.8	1
Biphenyl	ND		ug/l	2.0	0.46	1
4-Chloroaniline	ND		ug/l	5.0	1.1	1
2-Nitroaniline	ND		ug/l	5.0	0.50	1
3-Nitroaniline	ND		ug/l	5.0	0.81	1
4-Nitroaniline	ND		ug/l	5.0	0.80	1

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS****Lab ID:** L2316244-07**Date Collected:** 03/28/23 16:15**Client ID:** SOFB01_032823**Date Received:** 03/28/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dibenzofuran	ND		ug/l	2.0	0.50	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44	1
Acetophenone	ND		ug/l	5.0	0.53	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.35	1
2-Chlorophenol	ND		ug/l	2.0	0.48	1
2,4-Dichlorophenol	ND		ug/l	5.0	0.41	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.8	1
2-Nitrophenol	ND		ug/l	10	0.85	1
4-Nitrophenol	ND		ug/l	10	0.67	1
2,4-Dinitrophenol	ND		ug/l	20	6.6	1
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8	1
Phenol	ND		ug/l	5.0	0.57	1
2-Methylphenol	ND		ug/l	5.0	0.49	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77	1
Benzoic Acid	ND		ug/l	50	2.6	1
Benzyl Alcohol	ND		ug/l	2.0	0.59	1
Carbazole	ND		ug/l	2.0	0.49	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	46		21-120
Phenol-d6	43		10-120
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	61		15-120
2,4,6-Tribromophenol	75		10-120
4-Terphenyl-d14	85		41-149

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 04/02/23 14:08
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 16:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	0.01	1
2-Chloronaphthalene	ND		ug/l	0.20	0.02	1
Fluoranthene	ND		ug/l	0.10	0.02	1
Hexachlorobutadiene	ND		ug/l	0.50	0.05	1
Naphthalene	ND		ug/l	0.10	0.05	1
Benzo(a)anthracene	ND		ug/l	0.10	0.02	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(b)fluoranthene	ND		ug/l	0.10	0.01	1
Benzo(k)fluoranthene	ND		ug/l	0.10	0.01	1
Chrysene	ND		ug/l	0.10	0.01	1
Acenaphthylene	ND		ug/l	0.10	0.01	1
Anthracene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
2-Methylnaphthalene	ND		ug/l	0.10	0.02	1
Pentachlorophenol	ND		ug/l	0.80	0.01	1
Hexachlorobenzene	ND		ug/l	0.80	0.01	1
Hexachloroethane	ND		ug/l	0.80	0.06	1

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS-SIM - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	51		21-120
Phenol-d6	47		10-120
Nitrobenzene-d5	67		23-120
2-Fluorobiphenyl	61		15-120
2,4,6-Tribromophenol	90		10-120
4-Terphenyl-d14	93		41-149

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 03/31/23 12:29
Analyst: JG

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1761053-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	98	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	29.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	29.
3,3'-Dichlorobenzidine	ND		ug/kg	160	44.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	98	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	18.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	26.
Isophorone	ND		ug/kg	150	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	19.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	57.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 03/31/23 12:29
Analyst: JG

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1761053-1					
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	98	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	98	28.
Benzo(k)fluoranthene	ND		ug/kg	98	26.
Chrysene	ND		ug/kg	98	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	98	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	98	20.
Dibenzo(a,h)anthracene	ND		ug/kg	98	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	98	16.
Biphenyl	ND		ug/kg	370	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	32.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	16.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	98	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	350	62.

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 03/31/23 12:29
Analyst: JG

Extraction Method: EPA 3546
Extraction Date: 03/30/23 23:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1761053-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	790	76.
4,6-Dinitro-o-cresol	ND		ug/kg	430	79.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	25.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	31.
Benzoic Acid	ND		ug/kg	530	170
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	25	7.5

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	66		25-120
Phenol-d6	67		10-120
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	71		30-120
2,4,6-Tribromophenol	79		10-136
4-Terphenyl-d14	78		18-120

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 12:01
Analyst: CMM

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 16:12

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 07 Batch: WG1761640-1					
Acenaphthene	ND		ug/l	2.0	0.44
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50
Hexachlorobenzene	ND		ug/l	2.0	0.46
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50
2-Chloronaphthalene	ND		ug/l	2.0	0.44
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93
Fluoranthene	ND		ug/l	2.0	0.26
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50
Hexachlorobutadiene	ND		ug/l	2.0	0.66
Hexachlorocyclopentadiene	ND		ug/l	20	0.69
Hexachloroethane	ND		ug/l	2.0	0.58
Isophorone	ND		ug/l	5.0	1.2
Naphthalene	ND		ug/l	2.0	0.46
Nitrobenzene	ND		ug/l	2.0	0.77
NDPA/DPA	ND		ug/l	2.0	0.42
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.5
Butyl benzyl phthalate	ND		ug/l	5.0	1.2
Di-n-butylphthalate	ND		ug/l	5.0	0.39
Di-n-octylphthalate	ND		ug/l	5.0	1.3
Diethyl phthalate	ND		ug/l	5.0	0.38

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 12:01
Analyst: CMM

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 16:12

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 07 Batch: WG1761640-1					
Dimethyl phthalate	ND		ug/l	5.0	1.8
Benzo(a)anthracene	ND		ug/l	2.0	0.32
Benzo(a)pyrene	ND		ug/l	2.0	0.41
Benzo(b)fluoranthene	ND		ug/l	2.0	0.35
Benzo(k)fluoranthene	ND		ug/l	2.0	0.37
Chrysene	ND		ug/l	2.0	0.34
Acenaphthylene	ND		ug/l	2.0	0.46
Anthracene	ND		ug/l	2.0	0.33
Benzo(ghi)perylene	ND		ug/l	2.0	0.30
Fluorene	ND		ug/l	2.0	0.41
Phenanthrene	ND		ug/l	2.0	0.33
Dibenzo(a,h)anthracene	ND		ug/l	2.0	0.32
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.0	0.40
Pyrene	ND		ug/l	2.0	0.28
Biphenyl	ND		ug/l	2.0	0.46
4-Chloroaniline	ND		ug/l	5.0	1.1
2-Nitroaniline	ND		ug/l	5.0	0.50
3-Nitroaniline	ND		ug/l	5.0	0.81
4-Nitroaniline	ND		ug/l	5.0	0.80
Dibenzofuran	ND		ug/l	2.0	0.50
2-Methylnaphthalene	ND		ug/l	2.0	0.45
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44
Acetophenone	ND		ug/l	5.0	0.53
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61
p-Chloro-m-cresol	ND		ug/l	2.0	0.35
2-Chlorophenol	ND		ug/l	2.0	0.48
2,4-Dichlorophenol	ND		ug/l	5.0	0.41
2,4-Dimethylphenol	ND		ug/l	5.0	1.8
2-Nitrophenol	ND		ug/l	10	0.85

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 12:01
Analyst: CMM

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 16:12

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 07 Batch: WG1761640-1					
4-Nitrophenol	ND		ug/l	10	0.67
2,4-Dinitrophenol	ND		ug/l	20	6.6
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8
Pentachlorophenol	ND		ug/l	10	1.8
Phenol	ND		ug/l	5.0	0.57
2-Methylphenol	ND		ug/l	5.0	0.49
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77
Benzoic Acid	ND		ug/l	50	2.6
Benzyl Alcohol	ND		ug/l	2.0	0.59
Carbazole	ND		ug/l	2.0	0.49

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	66		21-120
Phenol-d6	51		10-120
Nitrobenzene-d5	89		23-120
2-Fluorobiphenyl	88		15-120
2,4,6-Tribromophenol	85		10-120
4-Terphenyl-d14	99		41-149

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 04/02/23 15:32
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 16:11

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 07 Batch: WG1761642-1					
Acenaphthene	0.11		ug/l	0.10	0.01
2-Chloronaphthalene	ND		ug/l	0.20	0.02
Fluoranthene	0.06	J	ug/l	0.10	0.02
Hexachlorobutadiene	ND		ug/l	0.50	0.05
Naphthalene	0.13		ug/l	0.10	0.05
Benzo(a)anthracene	0.03	J	ug/l	0.10	0.02
Benzo(a)pyrene	0.02	J	ug/l	0.10	0.02
Benzo(b)fluoranthene	0.03	J	ug/l	0.10	0.01
Benzo(k)fluoranthene	0.03	J	ug/l	0.10	0.01
Chrysene	0.03	J	ug/l	0.10	0.01
Acenaphthylene	0.10		ug/l	0.10	0.01
Anthracene	0.07	J	ug/l	0.10	0.01
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01
Fluorene	0.15		ug/l	0.10	0.01
Phenanthrene	0.11		ug/l	0.10	0.02
Dibenzo(a,h)anthracene	0.02	J	ug/l	0.10	0.01
Indeno(1,2,3-cd)pyrene	0.02	J	ug/l	0.10	0.01
Pyrene	0.06	J	ug/l	0.10	0.02
2-Methylnaphthalene	0.28		ug/l	0.10	0.02
Pentachlorophenol	ND		ug/l	0.80	0.01
Hexachlorobenzene	0.01	J	ug/l	0.80	0.01
Hexachloroethane	ND		ug/l	0.80	0.06

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
 Analytical Date: 04/02/23 15:32
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 04/01/23 16:11

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 07 Batch: WG1761642-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	63		21-120
Phenol-d6	53		10-120
Nitrobenzene-d5	88		23-120
2-Fluorobiphenyl	77		15-120
2,4,6-Tribromophenol	117		10-120
4-Terphenyl-d14	81		41-149

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1761053-2 WG1761053-3								
Acenaphthene	64		64		31-137	0		50
1,2,4-Trichlorobenzene	68		67		38-107	1		50
Hexachlorobenzene	73		72		40-140	1		50
Bis(2-chloroethyl)ether	58		57		40-140	2		50
2-Chloronaphthalene	70		69		40-140	1		50
1,2-Dichlorobenzene	63		62		40-140	2		50
1,3-Dichlorobenzene	63		62		40-140	2		50
1,4-Dichlorobenzene	63		62		28-104	2		50
3,3'-Dichlorobenzidine	59		61		40-140	3		50
2,4-Dinitrotoluene	82		80		40-132	2		50
2,6-Dinitrotoluene	80		77		40-140	4		50
Fluoranthene	70		69		40-140	1		50
4-Chlorophenyl phenyl ether	72		71		40-140	1		50
4-Bromophenyl phenyl ether	74		73		40-140	1		50
Bis(2-chloroisopropyl)ether	48		48		40-140	0		50
Bis(2-chloroethoxy)methane	62		61		40-117	2		50
Hexachlorobutadiene	71		70		40-140	1		50
Hexachlorocyclopentadiene	83		81		40-140	2		50
Hexachloroethane	60		58		40-140	3		50
Isophorone	61		60		40-140	2		50
Naphthalene	64		62		40-140	3		50
Nitrobenzene	65		64		40-140	2		50
NDPA/DPA	71		71		36-157	0		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1761053-2 WG1761053-3								
n-Nitrosodi-n-propylamine	62		61		32-121	2		50
Bis(2-ethylhexyl)phthalate	71		70		40-140	1		50
Butyl benzyl phthalate	73		74		40-140	1		50
Di-n-butylphthalate	67		67		40-140	0		50
Di-n-octylphthalate	74		74		40-140	0		50
Diethyl phthalate	69		68		40-140	1		50
Dimethyl phthalate	73		71		40-140	3		50
Benzo(a)anthracene	69		69		40-140	0		50
Benzo(a)pyrene	71		71		40-140	0		50
Benzo(b)fluoranthene	67		68		40-140	1		50
Benzo(k)fluoranthene	71		71		40-140	0		50
Chrysene	68		67		40-140	1		50
Acenaphthylene	70		68		40-140	3		50
Anthracene	66		66		40-140	0		50
Benzo(ghi)perylene	66		66		40-140	0		50
Fluorene	69		68		40-140	1		50
Phenanthrene	66		65		40-140	2		50
Dibenzo(a,h)anthracene	65		64		40-140	2		50
Indeno(1,2,3-cd)pyrene	75		75		40-140	0		50
Pyrene	68		69		35-142	1		50
Biphenyl	72		70		37-127	3		50
4-Chloroaniline	50		46		40-140	8		50
2-Nitroaniline	79		76		47-134	4		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1761053-2 WG1761053-3								
3-Nitroaniline	65		64		26-129	2		50
4-Nitroaniline	76		75		41-125	1		50
Dibenzofuran	68		68		40-140	0		50
2-Methylnaphthalene	69		68		40-140	1		50
1,2,4,5-Tetrachlorobenzene	78		77		40-117	1		50
Acetophenone	66		65		14-144	2		50
2,4,6-Trichlorophenol	82		77		30-130	6		50
p-Chloro-m-cresol	73		72		26-103	1		50
2-Chlorophenol	67		66		25-102	2		50
2,4-Dichlorophenol	71		71		30-130	0		50
2,4-Dimethylphenol	71		70		30-130	1		50
2-Nitrophenol	76		73		30-130	4		50
4-Nitrophenol	75		74		11-114	1		50
2,4-Dinitrophenol	79		77		4-130	3		50
4,6-Dinitro-o-cresol	91		90		10-130	1		50
Pentachlorophenol	75		74		17-109	1		50
Phenol	65		64		26-90	2		50
2-Methylphenol	66		65		30-130.	2		50
3-Methylphenol/4-Methylphenol	66		65		30-130	2		50
2,4,5-Trichlorophenol	78		81		30-130	4		50
Benzoic Acid	60		56		10-110	7		50
Benzyl Alcohol	66		65		40-140	2		50
Carbazole	66		66		54-128	0		50

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1761053-2 WG1761053-3								
1,4-Dioxane	50		50		40-140	0		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	71		69		25-120
Phenol-d6	69		69		10-120
Nitrobenzene-d5	68		68		23-120
2-Fluorobiphenyl	72		70		30-120
2,4,6-Tribromophenol	81		80		10-136
4-Terphenyl-d14	69		71		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG1761640-2 WG1761640-3								
Acenaphthene	80		74		37-111	8		30
1,2,4-Trichlorobenzene	82		78		39-98	5		30
Hexachlorobenzene	78		70		40-140	11		30
Bis(2-chloroethyl)ether	77		75		40-140	3		30
2-Chloronaphthalene	81		75		40-140	8		30
1,2-Dichlorobenzene	71		71		40-140	0		30
1,3-Dichlorobenzene	70		69		40-140	1		30
1,4-Dichlorobenzene	70		70		36-97	0		30
3,3'-Dichlorobenzidine	75		67		40-140	11		30
2,4-Dinitrotoluene	92		90		48-143	2		30
2,6-Dinitrotoluene	94		95		40-140	1		30
Fluoranthene	90		85		40-140	6		30
4-Chlorophenyl phenyl ether	89		80		40-140	11		30
4-Bromophenyl phenyl ether	85		75		40-140	13		30
Bis(2-chloroisopropyl)ether	113		107		40-140	5		30
Bis(2-chloroethoxy)methane	80		74		40-140	8		30
Hexachlorobutadiene	80		76		40-140	5		30
Hexachlorocyclopentadiene	72		68		40-140	6		30
Hexachloroethane	78		69		40-140	12		30
Isophorone	80		76		40-140	5		30
Naphthalene	75		73		40-140	3		30
Nitrobenzene	86		81		40-140	6		30
NDPA/DPA	97		84		40-140	14		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG1761640-2 WG1761640-3								
n-Nitrosodi-n-propylamine	86		80		29-132	7		30
Bis(2-ethylhexyl)phthalate	106		96		40-140	10		30
Butyl benzyl phthalate	98		92		40-140	6		30
Di-n-butylphthalate	92		82		40-140	11		30
Di-n-octylphthalate	99		89		40-140	11		30
Diethyl phthalate	93		82		40-140	13		30
Dimethyl phthalate	91		82		40-140	10		30
Benzo(a)anthracene	94		87		40-140	8		30
Benzo(a)pyrene	90		84		40-140	7		30
Benzo(b)fluoranthene	89		78		40-140	13		30
Benzo(k)fluoranthene	88		80		40-140	10		30
Chrysene	90		80		40-140	12		30
Acenaphthylene	87		81		45-123	7		30
Anthracene	84		80		40-140	5		30
Benzo(ghi)perylene	82		71		40-140	14		30
Fluorene	90		81		40-140	11		30
Phenanthrene	84		75		40-140	11		30
Dibenzo(a,h)anthracene	83		75		40-140	10		30
Indeno(1,2,3-cd)pyrene	97		86		40-140	12		30
Pyrene	91		85		26-127	7		30
Biphenyl	98		91		40-140	7		30
4-Chloroaniline	83		86		40-140	4		30
2-Nitroaniline	90		86		52-143	5		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG1761640-2 WG1761640-3								
3-Nitroaniline	80		69		25-145	15		30
4-Nitroaniline	86		80		51-143	7		30
Dibenzofuran	86		78		40-140	10		30
2-Methylnaphthalene	79		77		40-140	3		30
1,2,4,5-Tetrachlorobenzene	99		92		2-134	7		30
Acetophenone	89		88		39-129	1		30
2,4,6-Trichlorophenol	107		99		30-130	8		30
p-Chloro-m-cresol	89		84		23-97	6		30
2-Chlorophenol	81		83		27-123	2		30
2,4-Dichlorophenol	99		94		30-130	5		30
2,4-Dimethylphenol	78		70		30-130	11		30
2-Nitrophenol	118		110		30-130	7		30
4-Nitrophenol	104	Q	93	Q	10-80	11		30
2,4-Dinitrophenol	156	Q	148	Q	20-130	5		30
4,6-Dinitro-o-cresol	162		155		20-164	4		30
Pentachlorophenol	107	Q	95		9-103	12		30
Phenol	58		59		12-110	2		30
2-Methylphenol	79		72		30-130	9		30
3-Methylphenol/4-Methylphenol	84		82		30-130	2		30
2,4,5-Trichlorophenol	99		90		30-130	10		30
Benzoic Acid	84		75		10-164	11		30
Benzyl Alcohol	78		71		26-116	9		30
Carbazole	85		80		55-144	6		30

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG1761640-2 WG1761640-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	70		66		21-120
Phenol-d6	57		54		10-120
Nitrobenzene-d5	84		81		23-120
2-Fluorobiphenyl	85		80		15-120
2,4,6-Tribromophenol	91		78		10-120
4-Terphenyl-d14	89		83		41-149

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 07 Batch: WG1761642-2 WG1761642-3								
Acenaphthene	87		84		40-140	4		40
2-Chloronaphthalene	91		88		40-140	3		40
Fluoranthene	104		99		40-140	5		40
Hexachlorobutadiene	91		90		40-140	1		40
Naphthalene	83		83		40-140	0		40
Benzo(a)anthracene	106		101		40-140	5		40
Benzo(a)pyrene	111		103		40-140	7		40
Benzo(b)fluoranthene	109		98		40-140	11		40
Benzo(k)fluoranthene	104		101		40-140	3		40
Chrysene	96		89		40-140	8		40
Acenaphthylene	102		99		40-140	3		40
Anthracene	104		97		40-140	7		40
Benzo(ghi)perylene	99		95		40-140	4		40
Fluorene	96		92		40-140	4		40
Phenanthrene	92		87		40-140	6		40
Dibenzo(a,h)anthracene	110		104		40-140	6		40
Indeno(1,2,3-cd)pyrene	115		109		40-140	5		40
Pyrene	101		96		40-140	5		40
2-Methylnaphthalene	88		85		40-140	3		40
Pentachlorophenol	117		109		40-140	7		40
Hexachlorobenzene	101		95		40-140	6		40
Hexachloroethane	80		80		40-140	0		40

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH STREET**Project Number:** 170697301**Lab Number:** L2316244**Report Date:** 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 07 Batch: WG1761642-2 WG1761642-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	78		77		21-120
Phenol-d6	69		66		10-120
Nitrobenzene-d5	105		102		23-120
2-Fluorobiphenyl	90		88		15-120
2,4,6-Tribromophenol	115		109		10-120
4-Terphenyl-d14	104		99		41-149

PCBS

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 1,8082A
Analytical Date: 04/03/23 09:25
Analyst: JM

Extraction Method: EPA 3510C
Extraction Date: 04/02/23 16:10
Cleanup Method: EPA 3665A
Cleanup Date: 04/02/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/03/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.071	0.061	1	A
Aroclor 1221	ND		ug/l	0.071	0.061	1	A
Aroclor 1232	ND		ug/l	0.071	0.061	1	A
Aroclor 1242	ND		ug/l	0.071	0.061	1	A
Aroclor 1248	ND		ug/l	0.071	0.061	1	A
Aroclor 1254	ND		ug/l	0.071	0.061	1	A
Aroclor 1260	ND		ug/l	0.071	0.061	1	A
Aroclor 1262	ND		ug/l	0.071	0.061	1	A
Aroclor 1268	ND		ug/l	0.071	0.061	1	A
PCBs, Total	ND		ug/l	0.071	0.061	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	104		30-150	A
Decachlorobiphenyl	88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	100		30-150	B
Decachlorobiphenyl	95		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8082A
Analytical Date: 04/03/23 08:59
Analyst: JM

Extraction Method: EPA 3510C
Extraction Date: 04/02/23 16:10
Cleanup Method: EPA 3665A
Cleanup Date: 04/02/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/03/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 07 Batch: WG1761806-1						
Aroclor 1016	ND		ug/l	0.071	0.061	A
Aroclor 1221	ND		ug/l	0.071	0.061	A
Aroclor 1232	ND		ug/l	0.071	0.061	A
Aroclor 1242	ND		ug/l	0.071	0.061	A
Aroclor 1248	ND		ug/l	0.071	0.061	A
Aroclor 1254	ND		ug/l	0.071	0.061	A
Aroclor 1260	ND		ug/l	0.071	0.061	A
Aroclor 1262	ND		ug/l	0.071	0.061	A
Aroclor 1268	ND		ug/l	0.071	0.061	A
PCBs, Total	ND		ug/l	0.071	0.061	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	101		30-150	A
2,4,5,6-Tetrachloro-m-xylene	99		30-150	B
Decachlorobiphenyl	110		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 07 Batch: WG1761806-2 WG1761806-3									
Aroclor 1016	94		92		40-140	2		50	A
Aroclor 1260	84		83		40-140	1		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	101		99		30-150	A
Decachlorobiphenyl	108		103		30-150	A
2,4,5,6-Tetrachloro-m-xylene	98		93		30-150	B
Decachlorobiphenyl	115		108		30-150	B

PESTICIDES

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01
Client ID: SB08_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 04/01/23 14:14
Analyst: MMG
Percent Solids: 90%

Extraction Method: EPA 3546
Extraction Date: 03/31/23 01:02
Cleanup Method: EPA 3620B
Cleanup Date: 04/01/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/01/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/kg	1.74	0.341	1	A
Lindane	ND		ug/kg	0.725	0.324	1	A
Alpha-BHC	ND		ug/kg	0.725	0.206	1	A
Beta-BHC	ND		ug/kg	1.74	0.660	1	A
Heptachlor	ND		ug/kg	0.870	0.390	1	A
Aldrin	ND		ug/kg	1.74	0.612	1	A
Heptachlor epoxide	ND		ug/kg	3.26	0.978	1	A
Endrin	ND		ug/kg	0.725	0.297	1	A
Endrin aldehyde	ND		ug/kg	2.17	0.761	1	A
Endrin ketone	ND		ug/kg	1.74	0.448	1	A
Dieldrin	ND		ug/kg	1.09	0.544	1	A
4,4'-DDE	1.39	J	ug/kg	1.74	0.402	1	A
4,4'-DDD	ND		ug/kg	1.74	0.620	1	A
4,4'-DDT	ND		ug/kg	1.74	1.40	1	B
Endosulfan I	ND		ug/kg	1.74	0.411	1	A
Endosulfan II	ND		ug/kg	1.74	0.581	1	A
Endosulfan sulfate	ND		ug/kg	0.725	0.345	1	A
Methoxychlor	ND		ug/kg	3.26	1.01	1	A
Toxaphene	ND		ug/kg	32.6	9.13	1	A
cis-Chlordane	ND		ug/kg	2.17	0.606	1	A
trans-Chlordane	ND		ug/kg	2.17	0.574	1	A
Chlordane	ND		ug/kg	14.5	5.76	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01
Client ID: SB08_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
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Organochlorine Pesticides by GC - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	43		30-150	A
Decachlorobiphenyl	41		30-150	A
2,4,5,6-Tetrachloro-m-xylene	41		30-150	B
Decachlorobiphenyl	38		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01
Client ID: SB08_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8151A
Analytical Date: 03/30/23 18:18
Analyst: MSF
Percent Solids: 90%
Methylation Date: 03/30/23 05:30

Extraction Method: EPA 8151A
Extraction Date: 03/29/23 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	180	11.3	1	A
2,4,5-T	ND		ug/kg	180	5.56	1	A
2,4,5-TP (Silvex)	ND		ug/kg	180	4.78	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	108		30-150	A
DCAA	109		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-03
Client ID: SB09_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:05
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 04/01/23 14:25
Analyst: MMG
Percent Solids: 91%

Extraction Method: EPA 3546
Extraction Date: 03/31/23 01:02
Cleanup Method: EPA 3620B
Cleanup Date: 04/01/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/01/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/kg	1.70	0.333	1	A
Lindane	ND		ug/kg	0.708	0.316	1	A
Alpha-BHC	ND		ug/kg	0.708	0.201	1	A
Beta-BHC	ND		ug/kg	1.70	0.644	1	A
Heptachlor	ND		ug/kg	0.849	0.381	1	A
Aldrin	ND		ug/kg	1.70	0.598	1	A
Heptachlor epoxide	ND		ug/kg	3.18	0.955	1	A
Endrin	ND		ug/kg	0.708	0.290	1	A
Endrin aldehyde	ND		ug/kg	2.12	0.743	1	A
Endrin ketone	ND		ug/kg	1.70	0.437	1	A
Dieldrin	ND		ug/kg	1.06	0.531	1	A
4,4'-DDE	ND		ug/kg	1.70	0.393	1	A
4,4'-DDD	5.42		ug/kg	1.70	0.606	1	A
4,4'-DDT	ND		ug/kg	1.70	1.36	1	A
Endosulfan I	ND		ug/kg	1.70	0.401	1	A
Endosulfan II	ND		ug/kg	1.70	0.568	1	A
Endosulfan sulfate	ND		ug/kg	0.708	0.337	1	A
Methoxychlor	ND		ug/kg	3.18	0.991	1	A
Toxaphene	ND		ug/kg	31.8	8.92	1	A
cis-Chlordane	ND		ug/kg	2.12	0.592	1	A
trans-Chlordane	ND		ug/kg	2.12	0.560	1	A
Chlordane	ND		ug/kg	14.2	5.63	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-03
Client ID: SB09_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:05
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	63		30-150	A
Decachlorobiphenyl	66		30-150	A
2,4,5,6-Tetrachloro-m-xylene	61		30-150	B
Decachlorobiphenyl	63		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-03
Client ID: SB09_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:05
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8151A
Analytical Date: 03/30/23 18:36
Analyst: MSF
Percent Solids: 91%
Methylation Date: 03/30/23 05:30

Extraction Method: EPA 8151A
Extraction Date: 03/29/23 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
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Chlorinated Herbicides by GC - Westborough Lab

2,4-D	ND		ug/kg	182	11.5	1	A
2,4,5-T	ND		ug/kg	182	5.64	1	A
2,4,5-TP (Silvex)	ND		ug/kg	182	4.84	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	89		30-150	A
DCAA	96		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 04/01/23 14:37
Analyst: MMG
Percent Solids: 90%

Extraction Method: EPA 3546
Extraction Date: 03/31/23 01:02
Cleanup Method: EPA 3620B
Cleanup Date: 04/01/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/01/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/kg	1.73	0.338	1	A
Lindane	ND		ug/kg	0.720	0.322	1	A
Alpha-BHC	ND		ug/kg	0.720	0.204	1	A
Beta-BHC	ND		ug/kg	1.73	0.655	1	A
Heptachlor	ND		ug/kg	0.864	0.387	1	A
Aldrin	ND		ug/kg	1.73	0.608	1	A
Heptachlor epoxide	ND		ug/kg	3.24	0.972	1	A
Endrin	ND		ug/kg	0.720	0.295	1	A
Endrin aldehyde	ND		ug/kg	2.16	0.756	1	A
Endrin ketone	ND		ug/kg	1.73	0.445	1	A
Dieldrin	ND		ug/kg	1.08	0.540	1	A
4,4'-DDE	0.824	J	ug/kg	1.73	0.400	1	A
4,4'-DDD	ND		ug/kg	1.73	0.616	1	A
4,4'-DDT	ND		ug/kg	1.73	1.39	1	B
Endosulfan I	ND		ug/kg	1.73	0.408	1	A
Endosulfan II	ND		ug/kg	1.73	0.577	1	A
Endosulfan sulfate	ND		ug/kg	0.720	0.343	1	A
Methoxychlor	ND		ug/kg	3.24	1.01	1	A
Toxaphene	ND		ug/kg	32.4	9.07	1	A
cis-Chlordane	ND		ug/kg	2.16	0.602	1	A
trans-Chlordane	ND		ug/kg	2.16	0.570	1	A
Chlordane	ND		ug/kg	14.4	5.72	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	58		30-150	A
Decachlorobiphenyl	60		30-150	A
2,4,5,6-Tetrachloro-m-xylene	58		30-150	B
Decachlorobiphenyl	54		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05
Client ID: SB12_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8151A
Analytical Date: 03/30/23 18:55
Analyst: MSF
Percent Solids: 90%
Methylation Date: 03/30/23 05:30

Extraction Method: EPA 8151A
Extraction Date: 03/29/23 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
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Chlorinated Herbicides by GC - Westborough Lab

2,4-D	ND		ug/kg	181	11.4	1	A
2,4,5-T	ND		ug/kg	181	5.61	1	A
2,4,5-TP (Silvex)	ND		ug/kg	181	4.82	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	94		30-150	A
DCAA	89		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 04/03/23 19:03
Analyst: AAR

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 19:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/l	0.014	0.003	1	A
Lindane	ND		ug/l	0.014	0.003	1	A
Alpha-BHC	ND		ug/l	0.014	0.003	1	A
Beta-BHC	ND		ug/l	0.014	0.004	1	A
Heptachlor	ND		ug/l	0.014	0.002	1	A
Aldrin	ND		ug/l	0.014	0.002	1	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	1	A
Endrin	ND		ug/l	0.029	0.003	1	A
Endrin aldehyde	ND		ug/l	0.029	0.006	1	A
Endrin ketone	ND		ug/l	0.029	0.003	1	A
Dieldrin	ND		ug/l	0.029	0.003	1	A
4,4'-DDE	ND		ug/l	0.029	0.003	1	A
4,4'-DDD	ND		ug/l	0.029	0.003	1	A
4,4'-DDT	ND	IP	ug/l	0.029	0.003	1	A
Endosulfan I	ND		ug/l	0.014	0.002	1	A
Endosulfan II	ND		ug/l	0.029	0.004	1	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	1	A
Methoxychlor	ND		ug/l	0.143	0.005	1	A
Toxaphene	ND		ug/l	0.143	0.045	1	A
cis-Chlordane	ND		ug/l	0.014	0.005	1	A
trans-Chlordane	ND		ug/l	0.014	0.004	1	A
Chlordane	ND		ug/l	0.143	0.033	1	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		30-150	A
Decachlorobiphenyl	56		30-150	A
2,4,5,6-Tetrachloro-m-xylene	73		30-150	B
Decachlorobiphenyl	50		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07
Client ID: SOFB01_032823
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: EPA 8151A

Analytical Method: 1,8151A

Extraction Date: 03/30/23 10:23

Analytical Date: 03/31/23 23:34

Analyst: MMG

Methylation Date: 03/31/23 07:58

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
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Chlorinated Herbicides by GC - Westborough Lab

2,4-D	ND		ug/l	10.0	0.498	1	A
2,4,5-T	ND		ug/l	2.00	0.531	1	A
2,4,5-TP (Silvex)	ND		ug/l	2.00	0.539	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	85		30-150	A
DCAA	82		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8151A
Analytical Date: 03/30/23 10:59
Analyst: MMG

Extraction Method: EPA 8151A
Extraction Date: 03/29/23 09:06

Methylation Date: 03/30/23 05:30

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 01,03,05 Batch: WG1760205-1						
2,4-D	ND		ug/kg	162	10.2	A
2,4,5-T	ND		ug/kg	162	5.02	A
2,4,5-TP (Silvex)	ND		ug/kg	162	4.30	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	83		30-150	A
DCAA	83		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8151A
Analytical Date: 03/31/23 22:20
Analyst: MMG

Extraction Method: EPA 8151A
Extraction Date: 03/30/23 09:31

Methylation Date: 03/31/23 07:58

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 07 Batch: WG1760751-1						
2,4-D	ND		ug/l	10.0	0.498	A
2,4,5-T	ND		ug/l	2.00	0.531	A
2,4,5-TP (Silvex)	ND		ug/l	2.00	0.539	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	83		30-150	A
DCAA	82		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8081B
 Analytical Date: 04/01/23 15:00
 Analyst: MMG

Extraction Method: EPA 3546
 Extraction Date: 03/31/23 01:02
 Cleanup Method: EPA 3620B
 Cleanup Date: 04/01/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/01/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01,03,05 Batch: WG1761056-1						
Delta-BHC	ND		ug/kg	1.57	0.307	A
Lindane	ND		ug/kg	0.654	0.292	A
Alpha-BHC	ND		ug/kg	0.654	0.186	A
Beta-BHC	ND		ug/kg	1.57	0.595	A
Heptachlor	ND		ug/kg	0.784	0.352	A
Aldrin	ND		ug/kg	1.57	0.552	A
Heptachlor epoxide	ND		ug/kg	2.94	0.882	A
Endrin	ND		ug/kg	0.654	0.268	A
Endrin aldehyde	ND		ug/kg	1.96	0.686	A
Endrin ketone	ND		ug/kg	1.57	0.404	A
Dieldrin	ND		ug/kg	0.980	0.490	A
4,4'-DDE	ND		ug/kg	1.57	0.363	A
4,4'-DDD	ND		ug/kg	1.57	0.559	A
4,4'-DDT	ND		ug/kg	1.57	1.26	A
Endosulfan I	ND		ug/kg	1.57	0.370	A
Endosulfan II	ND		ug/kg	1.57	0.524	A
Endosulfan sulfate	ND		ug/kg	0.654	0.311	A
Methoxychlor	ND		ug/kg	2.94	0.915	A
Toxaphene	ND		ug/kg	29.4	8.24	A
cis-Chlordane	ND		ug/kg	1.96	0.546	A
trans-Chlordane	ND		ug/kg	1.96	0.518	A
Chlordane	ND		ug/kg	13.1	5.20	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
 Analytical Date: 04/01/23 15:00
 Analyst: MMG

Extraction Method: EPA 3546
 Extraction Date: 03/31/23 01:02
 Cleanup Method: EPA 3620B
 Cleanup Date: 04/01/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/01/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01,03,05 Batch: WG1761056-1						

Surrogate	%Recovery	Qualifier	Acceptance	
			Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	52		30-150	A
Decachlorobiphenyl	59		30-150	A
2,4,5,6-Tetrachloro-m-xylene	51		30-150	B
Decachlorobiphenyl	53		30-150	B

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 04/03/23 12:17
Analyst: MMG

Extraction Method: EPA 3510C
Extraction Date: 04/01/23 19:05

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 07 Batch: WG1761669-1						
Delta-BHC	ND		ug/l	0.014	0.003	A
Lindane	ND		ug/l	0.014	0.003	A
Alpha-BHC	ND		ug/l	0.014	0.003	A
Beta-BHC	ND		ug/l	0.014	0.004	A
Heptachlor	ND		ug/l	0.014	0.002	A
Aldrin	ND		ug/l	0.014	0.002	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	A
Endrin	ND		ug/l	0.029	0.003	A
Endrin aldehyde	ND		ug/l	0.029	0.006	A
Endrin ketone	ND		ug/l	0.029	0.003	A
Dieldrin	ND		ug/l	0.029	0.003	A
4,4'-DDE	ND		ug/l	0.029	0.003	A
4,4'-DDD	ND		ug/l	0.029	0.003	A
4,4'-DDT	ND		ug/l	0.029	0.003	A
Endosulfan I	ND		ug/l	0.014	0.002	A
Endosulfan II	ND		ug/l	0.029	0.004	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	A
Methoxychlor	ND		ug/l	0.143	0.005	A
Toxaphene	ND		ug/l	0.143	0.045	A
cis-Chlordane	ND		ug/l	0.014	0.005	A
trans-Chlordane	ND		ug/l	0.014	0.004	A
Chlordane	ND		ug/l	0.143	0.033	A

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
 Analytical Date: 04/03/23 12:17
 Analyst: MMG

Extraction Method: EPA 3510C
 Extraction Date: 04/01/23 19:05

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 07 Batch: WG1761669-1						

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	77		30-150	A
2,4,5,6-Tetrachloro-m-xylene	80		30-150	B
Decachlorobiphenyl	68		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 01,03,05 Batch: WG1760205-2 WG1760205-3									
2,4-D	90		88		30-150	2		30	A
2,4,5-T	96		95		30-150	1		30	A
2,4,5-TP (Silvex)	94		92		30-150	2		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	89		84		30-150	A
DCAA	92		86		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 07 Batch: WG1760751-2 WG1760751-3									
2,4-D	90		94		30-150	4		25	A
2,4,5-T	93		98		30-150	5		25	A
2,4,5-TP (Silvex)	93		96		30-150	3		25	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	85		88		30-150	A
DCAA	86		91		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01,03,05 Batch: WG1761056-2 WG1761056-3									
Delta-BHC	80		58		30-150	32	Q	30	A
Lindane	75		55		30-150	31	Q	30	A
Alpha-BHC	77		56		30-150	32	Q	30	A
Beta-BHC	74		55		30-150	29		30	A
Heptachlor	74		54		30-150	31	Q	30	A
Aldrin	75		55		30-150	31	Q	30	A
Heptachlor epoxide	72		52		30-150	32	Q	30	A
Endrin	76		56		30-150	30		30	A
Endrin aldehyde	63		46		30-150	31	Q	30	A
Endrin ketone	73		53		30-150	32	Q	30	A
Dieldrin	81		59		30-150	31	Q	30	A
4,4'-DDE	78		56		30-150	33	Q	30	A
4,4'-DDD	84		61		30-150	32	Q	30	A
4,4'-DDT	75		54		30-150	33	Q	30	A
Endosulfan I	75		55		30-150	31	Q	30	A
Endosulfan II	78		57		30-150	31	Q	30	A
Endosulfan sulfate	64		45		30-150	35	Q	30	A
Methoxychlor	74		54		30-150	31	Q	30	A
cis-Chlordane	79		58		30-150	31	Q	30	A
trans-Chlordane	97		71		30-150	31	Q	30	A

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01,03,05 Batch: WG1761056-2 WG1761056-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	66		50		30-150	A
Decachlorobiphenyl	71		54		30-150	A
2,4,5,6-Tetrachloro-m-xylene	64		48		30-150	B
Decachlorobiphenyl	65		50		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 07 Batch: WG1761669-2 WG1761669-3									
Delta-BHC	68		66		30-150	3		20	A
Lindane	77		74		30-150	3		20	A
Alpha-BHC	86		83		30-150	4		20	A
Beta-BHC	74		72		30-150	3		20	A
Heptachlor	87		82		30-150	6		20	A
Aldrin	83		79		30-150	4		20	A
Heptachlor epoxide	85		81		30-150	5		20	A
Endrin	83		79		30-150	5		20	A
Endrin aldehyde	70		61		30-150	15		20	A
Endrin ketone	87		82		30-150	6		20	A
Dieldrin	91		87		30-150	5		20	A
4,4'-DDE	82		78		30-150	4		20	A
4,4'-DDD	88		84		30-150	4		20	A
4,4'-DDT	77		87		30-150	13		20	A
Endosulfan I	81		78		30-150	4		20	A
Endosulfan II	84		80		30-150	5		20	A
Endosulfan sulfate	81		78		30-150	4		20	A
Methoxychlor	90		85		30-150	5		20	A
cis-Chlordane	73		61		30-150	17		20	A
trans-Chlordane	93		88		30-150	6		20	A

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH STREET**Project Number:** 170697301**Lab Number:** L2316244**Report Date:** 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 07 Batch: WG1761669-2 WG1761669-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	79		80		30-150	A
Decachlorobiphenyl	81		74		30-150	A
2,4,5,6-Tetrachloro-m-xylene	77		77		30-150	B
Decachlorobiphenyl	66		64		30-150	B

METALS

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-01

Date Collected: 03/28/23 15:20

Client ID: SB08_0-2

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	12100		mg/kg	8.58	2.32	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Antimony, Total	1.30	J	mg/kg	4.29	0.326	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Arsenic, Total	3.29		mg/kg	0.858	0.178	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Barium, Total	118		mg/kg	0.858	0.149	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.457		mg/kg	0.429	0.028	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Cadmium, Total	ND		mg/kg	0.858	0.084	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Calcium, Total	1770		mg/kg	8.58	3.00	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Chromium, Total	21.7		mg/kg	0.858	0.082	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Cobalt, Total	9.69		mg/kg	1.72	0.142	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Copper, Total	36.5		mg/kg	0.858	0.221	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Iron, Total	20300		mg/kg	4.29	0.775	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Lead, Total	4.47		mg/kg	4.29	0.230	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Magnesium, Total	6960		mg/kg	8.58	1.32	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Manganese, Total	179		mg/kg	0.858	0.136	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Mercury, Total	ND		mg/kg	0.070	0.045	1	03/31/23 07:15	04/03/23 18:59	EPA 7471B	1,7471B	ZNK
Nickel, Total	20.3		mg/kg	2.15	0.208	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Potassium, Total	7170		mg/kg	215	12.4	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.72	0.221	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.429	0.243	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Sodium, Total	192		mg/kg	172	2.70	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.72	0.270	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Vanadium, Total	34.7		mg/kg	0.858	0.174	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL
Zinc, Total	51.4		mg/kg	4.29	0.252	2	03/31/23 05:20	04/03/23 17:24	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	21.7		mg/kg	0.886	0.886	1		04/03/23 17:24	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-02

Date Collected: 03/28/23 16:10

Client ID: SB08_12-14

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 66%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	1550		mg/kg	11.9	3.21	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Antimony, Total	0.994	J	mg/kg	5.95	0.452	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Arsenic, Total	8.30		mg/kg	1.19	0.247	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Barium, Total	81.4		mg/kg	1.19	0.207	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.252	J	mg/kg	0.595	0.039	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Cadmium, Total	ND		mg/kg	1.19	0.116	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Calcium, Total	2050		mg/kg	11.9	4.16	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Chromium, Total	13.2		mg/kg	1.19	0.114	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Cobalt, Total	3.15		mg/kg	2.38	0.197	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Copper, Total	43.0		mg/kg	1.19	0.307	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Iron, Total	8420		mg/kg	5.95	1.07	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Lead, Total	54.7		mg/kg	5.95	0.319	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Magnesium, Total	601		mg/kg	11.9	1.83	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Manganese, Total	38.5		mg/kg	1.19	0.189	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Mercury, Total	0.147		mg/kg	0.097	0.063	1	03/31/23 07:15	04/03/23 19:02	EPA 7471B	1,7471B	ZNK
Nickel, Total	13.6		mg/kg	2.97	0.288	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Potassium, Total	413		mg/kg	297	17.1	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Selenium, Total	0.568	J	mg/kg	2.38	0.307	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.595	0.336	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Sodium, Total	212	J	mg/kg	238	3.75	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Thallium, Total	0.432	J	mg/kg	2.38	0.375	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Vanadium, Total	22.1		mg/kg	1.19	0.241	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL
Zinc, Total	46.5		mg/kg	5.95	0.348	2	03/31/23 05:20	04/03/23 17:29	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	12.6	J	mg/kg	1.21	1.21	1		04/03/23 17:29	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-03

Date Collected: 03/28/23 12:05

Client ID: SB09_2-4

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	8010		mg/kg	8.42	2.27	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Antimony, Total	1.38	J	mg/kg	4.21	0.320	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Arsenic, Total	7.54		mg/kg	0.842	0.175	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Barium, Total	85.9		mg/kg	0.842	0.146	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.489		mg/kg	0.421	0.028	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Cadmium, Total	ND		mg/kg	0.842	0.083	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Calcium, Total	4730		mg/kg	8.42	2.95	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Chromium, Total	35.7		mg/kg	0.842	0.081	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Cobalt, Total	8.95		mg/kg	1.68	0.140	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Copper, Total	41.2		mg/kg	0.842	0.217	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Iron, Total	16100		mg/kg	4.21	0.760	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Lead, Total	22.1		mg/kg	4.21	0.226	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Magnesium, Total	4780		mg/kg	8.42	1.30	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Manganese, Total	194		mg/kg	0.842	0.134	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Mercury, Total	ND		mg/kg	0.070	0.046	1	03/31/23 07:15	04/03/23 19:05	EPA 7471B	1,7471B	ZNK
Nickel, Total	37.2		mg/kg	2.10	0.204	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Potassium, Total	3580		mg/kg	210	12.1	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.68	0.217	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.421	0.238	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Sodium, Total	117	J	mg/kg	168	2.65	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	1.68	0.265	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Vanadium, Total	35.8		mg/kg	0.842	0.171	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
Zinc, Total	58.8		mg/kg	4.21	0.247	2	03/31/23 05:20	04/03/23 17:34	EPA 3050B	1,6010D	GCL
General Chemistry - Mansfield Lab											
Chromium, Trivalent	34.8		mg/kg	0.878	0.878	1		04/03/23 17:34	NA	107,-	



Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-04

Date Collected: 03/28/23 12:15

Client ID: SB09_12-13.5

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	503		mg/kg	10.4	2.81	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Antimony, Total	2.90	J	mg/kg	5.21	0.396	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Arsenic, Total	4.21		mg/kg	1.04	0.217	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Barium, Total	41.9		mg/kg	1.04	0.181	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.139	J	mg/kg	0.521	0.034	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Cadmium, Total	0.395	J	mg/kg	1.04	0.102	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Calcium, Total	1610		mg/kg	10.4	3.65	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Chromium, Total	16.7		mg/kg	1.04	0.100	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Cobalt, Total	5.36		mg/kg	2.08	0.173	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Copper, Total	59.2		mg/kg	1.04	0.269	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Iron, Total	12000		mg/kg	5.21	0.941	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Lead, Total	82.4		mg/kg	5.21	0.279	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Magnesium, Total	340		mg/kg	10.4	1.60	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Manganese, Total	44.8		mg/kg	1.04	0.166	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Mercury, Total	0.134		mg/kg	0.084	0.055	1	03/31/23 07:15	04/03/23 19:09	EPA 7471B	1,7471B	ZNK
Nickel, Total	23.8		mg/kg	2.60	0.252	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Potassium, Total	85.0	J	mg/kg	260	15.0	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Selenium, Total	0.718	J	mg/kg	2.08	0.269	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.521	0.295	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Sodium, Total	146	J	mg/kg	208	3.28	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Thallium, Total	0.329	J	mg/kg	2.08	0.328	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Vanadium, Total	25.9		mg/kg	1.04	0.212	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL
Zinc, Total	180		mg/kg	5.21	0.305	2	03/31/23 05:20	04/03/23 17:39	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	16.0	J	mg/kg	1.07	1.07	1		04/03/23 17:39	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-05

Date Collected: 03/28/23 14:15

Client ID: SB12_0-2

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	16100		mg/kg	8.56	2.31	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Antimony, Total	2.46	J	mg/kg	4.28	0.325	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Arsenic, Total	1.10		mg/kg	0.856	0.178	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Barium, Total	158		mg/kg	0.856	0.149	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.616		mg/kg	0.428	0.028	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Cadmium, Total	ND		mg/kg	0.856	0.084	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Calcium, Total	1940		mg/kg	8.56	2.99	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Chromium, Total	32.6		mg/kg	0.856	0.082	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Cobalt, Total	12.8		mg/kg	1.71	0.142	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Copper, Total	43.5		mg/kg	0.856	0.221	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Iron, Total	25600		mg/kg	4.28	0.773	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Lead, Total	2.96	J	mg/kg	4.28	0.229	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Magnesium, Total	10000		mg/kg	8.56	1.32	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Manganese, Total	203		mg/kg	0.856	0.136	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Mercury, Total	ND		mg/kg	0.071	0.046	1	03/31/23 07:15	04/03/23 19:12	EPA 7471B	1,7471B	ZNK
Nickel, Total	29.6		mg/kg	2.14	0.207	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Potassium, Total	10600		mg/kg	214	12.3	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	1.71	0.221	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.428	0.242	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Sodium, Total	277		mg/kg	171	2.70	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Thallium, Total	1.03	J	mg/kg	1.71	0.270	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Vanadium, Total	43.5		mg/kg	0.856	0.174	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL
Zinc, Total	68.6		mg/kg	4.28	0.251	2	03/31/23 05:20	04/03/23 17:44	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	32.6		mg/kg	0.890	0.890	1		04/03/23 17:44	NA	107,-	
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Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**SAMPLE RESULTS**

Lab ID: L2316244-06

Date Collected: 03/28/23 14:35

Client ID: SB12_13.5-15

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	4150		mg/kg	10.2	2.75	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Antimony, Total	0.413	J	mg/kg	5.10	0.388	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Arsenic, Total	6.30		mg/kg	1.02	0.212	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Barium, Total	9.45		mg/kg	1.02	0.178	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Beryllium, Total	0.284	J	mg/kg	0.510	0.034	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Cadmium, Total	ND		mg/kg	1.02	0.100	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Calcium, Total	1050		mg/kg	10.2	3.57	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Chromium, Total	10.8		mg/kg	1.02	0.098	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Cobalt, Total	3.20		mg/kg	2.04	0.169	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Copper, Total	3.89		mg/kg	1.02	0.263	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Iron, Total	12200		mg/kg	5.10	0.921	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Lead, Total	4.46	J	mg/kg	5.10	0.273	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Magnesium, Total	1640		mg/kg	10.2	1.57	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Manganese, Total	79.5		mg/kg	1.02	0.162	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Mercury, Total	ND		mg/kg	0.086	0.056	1	03/31/23 07:15	04/03/23 19:15	EPA 7471B	1,7471B	ZNK
Nickel, Total	8.40		mg/kg	2.55	0.247	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Potassium, Total	806		mg/kg	255	14.7	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Selenium, Total	ND		mg/kg	2.04	0.263	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Silver, Total	ND		mg/kg	0.510	0.289	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Sodium, Total	471		mg/kg	204	3.21	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Thallium, Total	ND		mg/kg	2.04	0.321	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Vanadium, Total	13.2		mg/kg	1.02	0.207	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL
Zinc, Total	19.9		mg/kg	5.10	0.299	2	03/31/23 05:20	04/03/23 17:49	EPA 3050B	1,6010D	GCL

General Chemistry - Mansfield Lab

Chromium, Trivalent	10.8		mg/kg	1.07	1.07	1		04/04/23 15:36	NA	107,-	
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Project Name: 2731 W 12TH STREET

Lab Number: L2316244

Project Number: 170697301

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07

Date Collected: 03/28/23 16:15

Client ID: SOFB01_032823

Date Received: 03/28/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	ND		mg/l	0.0100	0.00327	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Antimony, Total	ND		mg/l	0.00400	0.00042	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Barium, Total	ND		mg/l	0.00050	0.00017	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Calcium, Total	ND		mg/l	0.100	0.0394	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Chromium, Total	ND		mg/l	0.00100	0.00017	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Cobalt, Total	ND		mg/l	0.00050	0.00016	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Copper, Total	ND		mg/l	0.00100	0.00038	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Iron, Total	ND		mg/l	0.0500	0.0191	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Lead, Total	ND		mg/l	0.00100	0.00034	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Manganese, Total	ND		mg/l	0.00100	0.00044	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Mercury, Total	ND		mg/l	0.00020	0.00009	1	04/03/23 11:56	04/03/23 20:20	EPA 7470A	1,7470A	ZNK
Nickel, Total	ND		mg/l	0.00200	0.00055	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Potassium, Total	ND		mg/l	0.100	0.0309	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Sodium, Total	ND		mg/l	0.100	0.0293	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Thallium, Total	0.00019	J	mg/l	0.00100	0.00014	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB
Zinc, Total	ND		mg/l	0.01000	0.00341	1	03/30/23 23:37	03/31/23 14:49	EPA 3005A	1,6020B	NTB

General Chemistry - Mansfield Lab

Chromium, Trivalent	ND		mg/l	0.010	0.010	1		03/31/23 14:49	NA	107,-	
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Project Name: 2731 W 12TH STREET

Lab Number: L2316244

Project Number: 170697301

Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-06 Batch: WG1760336-1										
Aluminum, Total	ND		mg/kg	4.00	1.08	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Antimony, Total	ND		mg/kg	2.00	0.152	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Arsenic, Total	ND		mg/kg	0.400	0.083	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Barium, Total	ND		mg/kg	0.400	0.070	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Beryllium, Total	ND		mg/kg	0.200	0.013	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Cadmium, Total	ND		mg/kg	0.400	0.039	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Calcium, Total	ND		mg/kg	4.00	1.40	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Chromium, Total	ND		mg/kg	0.400	0.038	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Cobalt, Total	ND		mg/kg	0.800	0.066	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Copper, Total	ND		mg/kg	0.400	0.103	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Iron, Total	0.470	J	mg/kg	2.00	0.361	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Lead, Total	ND		mg/kg	2.00	0.107	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Magnesium, Total	ND		mg/kg	4.00	0.616	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Manganese, Total	ND		mg/kg	0.400	0.064	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Nickel, Total	ND		mg/kg	1.00	0.097	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Potassium, Total	ND		mg/kg	100	5.76	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Selenium, Total	ND		mg/kg	0.800	0.103	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Silver, Total	ND		mg/kg	0.200	0.113	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Sodium, Total	ND		mg/kg	80.0	1.26	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Thallium, Total	ND		mg/kg	0.800	0.126	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Vanadium, Total	ND		mg/kg	0.400	0.081	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW
Zinc, Total	ND		mg/kg	2.00	0.117	1	03/31/23 05:20	04/02/23 11:54	1,6010D	EGW

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-06 Batch: WG1760339-1										
Mercury, Total	ND		mg/kg	0.083	0.054	1	03/31/23 07:15	04/03/23 17:02	1,7471B	ZNK



Project Name: 2731 W 12TH STREET

Lab Number: L2316244

Project Number: 170697301

Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Prep Information

Digestion Method: EPA 7471B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 07 Batch: WG1760668-1										
Aluminum, Total	ND		mg/l	0.0100	0.00327	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Antimony, Total	ND		mg/l	0.00400	0.00042	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Barium, Total	ND		mg/l	0.00050	0.00017	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Calcium, Total	ND		mg/l	0.100	0.0394	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Chromium, Total	ND		mg/l	0.00100	0.00017	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Cobalt, Total	ND		mg/l	0.00050	0.00016	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Copper, Total	ND		mg/l	0.00100	0.00038	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Iron, Total	ND		mg/l	0.0500	0.0191	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Lead, Total	ND		mg/l	0.00100	0.00034	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Manganese, Total	ND		mg/l	0.00100	0.00044	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Nickel, Total	ND		mg/l	0.00200	0.00055	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Potassium, Total	ND		mg/l	0.100	0.0309	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Sodium, Total	ND		mg/l	0.100	0.0293	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Thallium, Total	ND		mg/l	0.00100	0.00014	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB
Zinc, Total	ND		mg/l	0.01000	0.00341	1	03/30/23 23:37	03/31/23 13:52	1,6020B	NTB

Prep Information

Digestion Method: EPA 3005A



Project Name: 2731 W 12TH STREET

Lab Number: L2316244

Project Number: 170697301

Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 07 Batch: WG1761386-1										
Mercury, Total	ND		mg/l	0.00020	0.00009	1	04/03/23 11:56	04/03/23 19:34	1,7470A	ZNK

Prep Information

Digestion Method: EPA 7470A



Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06 Batch: WG1760336-2 SRM Lot Number: D116-540								
Aluminum, Total	87		-		45-155	-		
Antimony, Total	186		-		2-205	-		
Arsenic, Total	88		-		82-119	-		
Barium, Total	96		-		82-118	-		
Beryllium, Total	102		-		82-118	-		
Cadmium, Total	103		-		82-118	-		
Calcium, Total	97		-		81-119	-		
Chromium, Total	108		-		81-118	-		
Cobalt, Total	102		-		83-117	-		
Copper, Total	102		-		83-117	-		
Iron, Total	119		-		58-142	-		
Lead, Total	95		-		83-117	-		
Magnesium, Total	95		-		75-125	-		
Manganese, Total	95		-		82-118	-		
Nickel, Total	104		-		82-118	-		
Potassium, Total	93		-		68-131	-		
Selenium, Total	100		-		78-122	-		
Silver, Total	102		-		79-121	-		
Sodium, Total	99		-		71-130	-		
Thallium, Total	110		-		80-120	-		
Vanadium, Total	107		-		78-122	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06 Batch: WG1760336-2 SRM Lot Number: D116-540					
Zinc, Total	97	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01-06 Batch: WG1760339-2 SRM Lot Number: D116-540					
Mercury, Total	86	-	58-142	-	

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 07 Batch: WG1760668-2					
Aluminum, Total	91	-	80-120	-	
Antimony, Total	90	-	80-120	-	
Arsenic, Total	101	-	80-120	-	
Barium, Total	96	-	80-120	-	
Beryllium, Total	99	-	80-120	-	
Cadmium, Total	99	-	80-120	-	
Calcium, Total	82	-	80-120	-	
Chromium, Total	95	-	80-120	-	
Cobalt, Total	97	-	80-120	-	
Copper, Total	99	-	80-120	-	
Iron, Total	100	-	80-120	-	
Lead, Total	99	-	80-120	-	
Magnesium, Total	91	-	80-120	-	
Manganese, Total	96	-	80-120	-	
Nickel, Total	98	-	80-120	-	
Potassium, Total	89	-	80-120	-	
Selenium, Total	97	-	80-120	-	
Silver, Total	101	-	80-120	-	
Sodium, Total	93	-	80-120	-	
Thallium, Total	110	-	80-120	-	
Vanadium, Total	92	-	80-120	-	

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 07 Batch: WG1760668-2					
Zinc, Total	93	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 07 Batch: WG1761386-2					
Mercury, Total	99	-	80-120	-	

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06			QC Batch ID: WG1760336-3			QC Sample: L2316189-01			Client ID: MS Sample			
Aluminum, Total	8660	170	9100	258	Q	-	-		75-125	-		20
Antimony, Total	1.34J	42.6	39.0	92		-	-		75-125	-		20
Arsenic, Total	1.72	10.2	10.9	90		-	-		75-125	-		20
Barium, Total	71.6	170	235	96		-	-		75-125	-		20
Beryllium, Total	0.401J	4.26	4.54	106		-	-		75-125	-		20
Cadmium, Total	ND	4.52	3.50	77		-	-		75-125	-		20
Calcium, Total	17000	852	19500	293	Q	-	-		75-125	-		20
Chromium, Total	15.2	17	33.4	111		-	-		75-125	-		20
Cobalt, Total	6.56	42.6	43.2	86		-	-		75-125	-		20
Copper, Total	30.6	21.3	53.5	107		-	-		75-125	-		20
Iron, Total	15400	85.2	16400	1170	Q	-	-		75-125	-		20
Lead, Total	57.2	45.2	186	285	Q	-	-		75-125	-		20
Magnesium, Total	11500	852	12200	82		-	-		75-125	-		20
Manganese, Total	238	42.6	282	103		-	-		75-125	-		20
Nickel, Total	14.0	42.6	52.2	90		-	-		75-125	-		20
Potassium, Total	1780	852	2750	114		-	-		75-125	-		20
Selenium, Total	ND	10.2	8.61	84		-	-		75-125	-		20
Silver, Total	ND	4.26	3.95	93		-	-		75-125	-		20
Sodium, Total	271	852	1150	103		-	-		75-125	-		20
Thallium, Total	ND	10.2	8.36	82		-	-		75-125	-		20
Vanadium, Total	32.8	42.6	72.2	92		-	-		75-125	-		20

Matrix Spike Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06			QC Batch ID: WG1760336-3		QC Sample: L2316189-01		Client ID: MS Sample		
Zinc, Total	68.6	42.6	105	85	-	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-06			QC Batch ID: WG1760339-3		QC Sample: L2316189-01		Client ID: MS Sample		
Mercury, Total	0.122	1.4	1.55	102	-	-	80-120	-	20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 07 QC Batch ID: WG1760668-3 WG1760668-4 QC Sample: L2316019-03 Client ID: MS Sample									
Aluminum, Total	0.009J	2	1.80	90	1.63	82	75-125	10	20
Antimony, Total	0.0006J	0.5	0.4292	86	0.4017	80	75-125	7	20
Arsenic, Total	0.00040J	0.12	0.1262	105	0.1141	95	75-125	10	20
Barium, Total	0.00590	2	1.910	95	1.768	88	75-125	8	20
Beryllium, Total	ND	0.05	0.04996	100	0.04479	90	75-125	11	20
Cadmium, Total	ND	0.053	0.05244	99	0.04817	91	75-125	8	20
Calcium, Total	498	10	512	140	Q 467	0	Q 75-125	9	20
Chromium, Total	ND	0.2	0.1898	95	0.1732	87	75-125	9	20
Cobalt, Total	ND	0.5	0.4744	95	0.4361	87	75-125	8	20
Copper, Total	ND	0.25	0.2464	98	0.2199	88	75-125	11	20
Iron, Total	0.750	1	1.70	95	1.57	82	75-125	8	20
Lead, Total	ND	0.53	0.5367	101	0.4929	93	75-125	9	20
Magnesium, Total	42.9	10	50.0	71	Q 45.8	29	Q 75-125	9	20
Manganese, Total	0.03339	0.5	0.5123	96	0.4711	88	75-125	8	20
Nickel, Total	ND	0.5	0.4823	96	0.4390	88	75-125	9	20
Potassium, Total	1.87	10	10.6	87	9.49	76	75-125	11	20
Selenium, Total	ND	0.12	0.123	102	0.111	92	75-125	10	20
Silver, Total	ND	0.05	0.04935	99	0.04525	90	75-125	9	20
Sodium, Total	11.2	10	18.8	76	17.1	59	Q 75-125	9	20
Thallium, Total	0.0002J	0.12	0.1290	108	0.1181	98	75-125	9	20
Vanadium, Total	ND	0.5	0.4644	93	0.4220	84	75-125	10	20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 07 QC Batch ID: WG1760668-3 WG1760668-4 QC Sample: L2316019-03 Client ID: MS Sample									
Zinc, Total	0.0095J	0.5	0.4692	94	0.4252	85	75-125	10	20
Total Metals - Mansfield Lab Associated sample(s): 07 QC Batch ID: WG1761386-3 QC Sample: L2316682-07 Client ID: MS Sample									
Mercury, Total	ND	0.005	0.00492	98	-	-	75-125	-	20

Lab Duplicate Analysis *Batch Quality Control*

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1760336-4 QC Sample: L2316189-01 Client ID: DUP Sample						
Aluminum, Total	8660	8840	mg/kg	2		20
Antimony, Total	1.34J	1.24J	mg/kg	NC		20
Arsenic, Total	1.72	1.81	mg/kg	5		20
Barium, Total	71.6	76.0	mg/kg	6		20
Beryllium, Total	0.401J	0.397J	mg/kg	NC		20
Cadmium, Total	ND	ND	mg/kg	NC		20
Calcium, Total	17000	18200	mg/kg	7		20
Cobalt, Total	6.56	6.83	mg/kg	4		20
Copper, Total	30.6	33.7	mg/kg	10		20
Iron, Total	15400	16200	mg/kg	5		20
Lead, Total	57.2	49.2	mg/kg	15		20
Magnesium, Total	11500	10400	mg/kg	10		20
Manganese, Total	238	251	mg/kg	5		20
Nickel, Total	14.0	14.6	mg/kg	4		20
Potassium, Total	1780	1880	mg/kg	5		20
Selenium, Total	ND	ND	mg/kg	NC		20
Silver, Total	ND	ND	mg/kg	NC		20
Sodium, Total	271	270	mg/kg	0		20
Thallium, Total	ND	ND	mg/kg	NC		20

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Duplicate Analysis
Batch Quality Control

Lab Number: L2316244
Report Date: 04/04/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1760336-4 QC Sample: L2316189-01 Client ID: DUP Sample					
Zinc, Total	68.6	62.0	mg/kg	10	20
Total Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1760336-4 QC Sample: L2316189-01 Client ID: DUP Sample					
Chromium, Total	15.2	16.2	mg/kg	12	20
Vanadium, Total	32.8	34.5	mg/kg	5	20
Total Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1760339-4 QC Sample: L2316189-01 Client ID: DUP Sample					
Mercury, Total	0.122	0.134	mg/kg	9	20
Total Metals - Mansfield Lab Associated sample(s): 07 QC Batch ID: WG1761386-4 QC Sample: L2316682-07 Client ID: DUP Sample					
Mercury, Total	ND	0.00011J	mg/l	NC	20

Project Name: 2731 W 12TH STREET
Project Number: 170697301

**Lab Serial Dilution
Analysis
Batch Quality Control**

Lab Number: L2316244
Report Date: 04/04/23

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1760336-6 QC Sample: L2316189-01 Client ID: DUP Sample						
Aluminum, Total	8660	9560	mg/kg	10		20
Barium, Total	71.6	79.1	mg/kg	10		20
Calcium, Total	17000	19300	mg/kg	14		20
Copper, Total	30.6	32.8	mg/kg	7		20
Iron, Total	15400	18300	mg/kg	19		20
Magnesium, Total	11500	13000	mg/kg	13		20
Manganese, Total	238	273	mg/kg	15		20
Total Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1760336-6 QC Sample: L2316189-01 Client ID: DUP Sample						
Vanadium, Total	32.8	33.3	mg/kg	2		20

INORGANICS & MISCELLANEOUS

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-01

Client ID: SB08_0-2

Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 15:20

Date Received: 03/28/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.3		%	0.100	NA	1	-	03/29/23 10:45	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.1	0.22	1	04/01/23 11:10	04/03/23 14:15	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.886	0.177	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-02

Client ID: SB08_12-14

Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:10

Date Received: 03/28/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	66.1		%	0.100	NA	1	-	03/29/23 12:52	121,2540G	ROI
Cyanide, Total	4.9		mg/kg	1.4	0.30	1	04/01/23 11:10	04/03/23 14:16	1,9010C/9012B	JER
Chromium, Hexavalent	0.650	J	mg/kg	1.21	0.242	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-03

Client ID: SB09_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:05

Date Received: 03/28/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.1		%	0.100	NA	1	-	03/29/23 12:52	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.0	0.22	1	04/01/23 11:10	04/03/23 14:17	1,9010C/9012B	JER
Chromium, Hexavalent	0.878		mg/kg	0.878	0.176	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-04
Client ID: SB09_12-13.5
Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 12:15
Date Received: 03/28/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	74.5		%	0.100	NA	1	-	03/29/23 10:45	121,2540G	ROI
Cyanide, Total	0.32	J	mg/kg	1.3	0.27	1	04/01/23 11:10	04/03/23 14:20	1,9010C/9012B	JER
Chromium, Hexavalent	0.658	J	mg/kg	1.07	0.215	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-05

Client ID: SB12_0-2

Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:15

Date Received: 03/28/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.9		%	0.100	NA	1	-	03/29/23 10:45	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.0	0.22	1	04/01/23 11:10	04/03/23 14:21	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.890	0.178	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-06

Client ID: SB12_13.5-15

Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 14:35

Date Received: 03/28/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	74.6		%	0.100	NA	1	-	03/29/23 10:45	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.3	0.27	1	04/01/23 11:10	04/03/23 14:22	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	1.07	0.214	1	04/03/23 16:44	04/04/23 15:36	1,7196A	LOF



Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

SAMPLE RESULTS

Lab ID: L2316244-07

Client ID: SOFB01_032823

Sample Location: BROOKLYN, NY

Date Collected: 03/28/23 16:15

Date Received: 03/28/23

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/l	0.005	0.001	1	04/03/23 06:50	04/03/23 15:41	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	03/29/23 11:15	03/29/23 11:35	1,7196A	KEP



Project Name: 2731 W 12TH STREET

Lab Number: L2316244

Project Number: 170697301

Report Date: 04/04/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 07 Batch: WG1760275-1										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	03/29/23 11:15	03/29/23 11:33	1,7196A	KEP
General Chemistry - Westborough Lab for sample(s): 01-05 Batch: WG1760922-1										
Chromium, Hexavalent	0.220	J	mg/kg	0.800	0.160	1	03/30/23 16:43	03/31/23 11:47	1,7196A	LOF
General Chemistry - Westborough Lab for sample(s): 01-06 Batch: WG1761559-1										
Cyanide, Total	ND		mg/kg	0.88	0.19	1	04/01/23 11:10	04/03/23 14:04	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 07 Batch: WG1761845-1										
Cyanide, Total	ND		mg/l	0.005	0.001	1	04/03/23 06:50	04/03/23 15:27	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 06 Batch: WG1761993-1										
Chromium, Hexavalent	ND		mg/kg	0.800	0.160	1	04/03/23 16:44	04/04/23 15:36	1,7196A	LOF

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 07 Batch: WG1760275-2								
Chromium, Hexavalent	96		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 Batch: WG1760922-2								
Chromium, Hexavalent	70	Q	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-06 Batch: WG1761559-2 WG1761559-3								
Cyanide, Total	86		92		80-120	7		35
General Chemistry - Westborough Lab Associated sample(s): 07 Batch: WG1761845-2 WG1761845-3								
Cyanide, Total	104		110		85-115	6		20
General Chemistry - Westborough Lab Associated sample(s): 06 Batch: WG1761993-2								
Chromium, Hexavalent	79	Q	-		80-120	-		20

Matrix Spike Analysis **Batch Quality Control**

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 07 QC Batch ID: WG1760275-4 QC Sample: L2316244-07 Client ID: SOFB01_032823												
Chromium, Hexavalent	ND	0.1	0.098	98		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1760922-4 QC Sample: L2315966-05 Client ID: MS Sample												
Chromium, Hexavalent	ND	1530	1290	84		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1761559-4 WG1761559-5 QC Sample: L2316114-02 Client ID: MS Sample												
Cyanide, Total	ND	11	12	110		10	99		75-125	11		35
General Chemistry - Westborough Lab Associated sample(s): 07 QC Batch ID: WG1761845-4 WG1761845-5 QC Sample: L2314807-01 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.226	113		0.218	109		80-120	4		20
General Chemistry - Westborough Lab Associated sample(s): 06 QC Batch ID: WG1761993-4 QC Sample: L2316244-06 Client ID: SB12_13.5-15												
Chromium, Hexavalent	ND	1510	755	50	Q	-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 2731 W 12TH STREET

Project Number: 170697301

Lab Number: L2316244

Report Date: 04/04/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01,04-06 QC Batch ID: WG1760174-1 QC Sample: L2316119-01 Client ID: DUP Sample						
Solids, Total	73.4	67.4	%	9		20
General Chemistry - Westborough Lab Associated sample(s): 02-03 QC Batch ID: WG1760233-1 QC Sample: L2316214-32 Client ID: DUP Sample						
Solids, Total	88.9	88.3	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 07 QC Batch ID: WG1760275-3 QC Sample: L2316244-07 Client ID: SOFB01_032823						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-05 QC Batch ID: WG1760922-6 QC Sample: L2315966-05 Client ID: DUP Sample						
Chromium, Hexavalent	ND	0.200J	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 06 QC Batch ID: WG1761993-6 QC Sample: L2316244-06 Client ID: SB12_13.5-15						
Chromium, Hexavalent	ND	ND	mg/kg	NC		20

Project Name: 2731 W 12TH STREET**Lab Number:** L2316244**Project Number:** 170697301**Report Date:** 04/04/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316244-01A	Vial MeOH preserved	B	NA		3.4	Y	Absent		NYTCL-8260HLW(14)
L2316244-01B	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-01C	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-01D	Plastic 120ml unpreserved	B	NA		3.4	Y	Absent		TS(7)
L2316244-01E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.4	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),TL-TI(180),AL-TI(180),NI-TI(180),ZN-TI(180),PB-TI(180),SE-TI(180),SB-TI(180),CU-TI(180),V-TI(180),CO-TI(180),MG-TI(180),HG-T(28),FE-TI(180),MN-TI(180),K-TI(180),CD-TI(180),NA-TI(180),CA-TI(180)
L2316244-01F	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		NYTCL-8270(14),TCN-9010(14),HERB-APA(14),NYTCL-8081(14),HEXCR-7196(30)
L2316244-01G	Glass 500ml/16oz unpreserved	B	NA		3.4	Y	Absent		NYTCL-8270(14),TCN-9010(14),HERB-APA(14),NYTCL-8081(14),HEXCR-7196(30)
L2316244-02A	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.4	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),TL-TI(180),NI-TI(180),CU-TI(180),SB-TI(180),PB-TI(180),ZN-TI(180),SE-TI(180),V-TI(180),CO-TI(180),MN-TI(180),HG-T(28),MG-TI(180),FE-TI(180),CA-TI(180),K-TI(180),NA-TI(180),CD-TI(180)
L2316244-02B	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		TCN-9010(14),NYTCL-8270(14),TS(7),HEXCR-7196(30)
L2316244-02C	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		TCN-9010(14),NYTCL-8270(14),TS(7),HEXCR-7196(30)
L2316244-03A	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.4	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),TL-TI(180),CR-TI(180),AL-TI(180),NI-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),ZN-TI(180),SE-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MG-TI(180),MN-TI(180),K-TI(180),NA-TI(180),CA-TI(180),CD-TI(180)
L2316244-03B	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		TCN-9010(14),NYTCL-8270(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Serial_No:04042318:22
Lab Number: L2316244
Report Date: 04/04/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316244-03C	Glass 500ml/16oz unpreserved	B	NA		3.4	Y	Absent		TCN-9010(14),NYTCL-8270(14),HERB-APA(14),TS(7),NYTCL-8081(14),HEXCR-7196(30)
L2316244-04A	Vial MeOH preserved	B	NA		3.4	Y	Absent		NYTCL-8260HLW(14)
L2316244-04B	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-04C	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-04D	Plastic 120ml unpreserved	B	NA		3.4	Y	Absent		TS(7)
L2316244-04E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.4	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),NI-TI(180),TL-TI(180),AL-TI(180),CR-TI(180),PB-TI(180),ZN-TI(180),CU-TI(180),SE-TI(180),SB-TI(180),V-TI(180),CO-TI(180),MG-TI(180),HG-T(28),MN-TI(180),FE-TI(180),K-TI(180),CA-TI(180),CD-TI(180),NA-TI(180)
L2316244-04F	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316244-04G	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316244-05A	Vial MeOH preserved	B	NA		3.4	Y	Absent		NYTCL-8260HLW(14)
L2316244-05B	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-05C	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-05D	Plastic 120ml unpreserved	B	NA		3.4	Y	Absent		TS(7)
L2316244-05E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.4	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),NI-TI(180),AL-TI(180),CR-TI(180),TL-TI(180),CU-TI(180),SE-TI(180),PB-TI(180),SB-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MG-TI(180),MN-TI(180),CA-TI(180),K-TI(180),NA-TI(180),CD-TI(180)
L2316244-05F	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		TCN-9010(14),NYTCL-8270(14),HERB-APA(14),NYTCL-8081(14),HEXCR-7196(30)
L2316244-05G	Glass 500ml/16oz unpreserved	B	NA		3.4	Y	Absent		TCN-9010(14),NYTCL-8270(14),HERB-APA(14),NYTCL-8081(14),HEXCR-7196(30)
L2316244-06A	Vial MeOH preserved	B	NA		3.4	Y	Absent		NYTCL-8260HLW(14)
L2316244-06B	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-06C	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	NYTCL-8260HLW(14)
L2316244-06D	Plastic 120ml unpreserved	B	NA		3.4	Y	Absent		TS(7)

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Serial_No:04042318:22
Lab Number: L2316244
Report Date: 04/04/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316244-06E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.4	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),TL-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),ZN-TI(180),SE-TI(180),CO-TI(180),V-TI(180),MG-TI(180),FE-TI(180),HG-T(28),MN-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L2316244-06F	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316244-06G	Glass 120ml/4oz unpreserved	B	NA		3.4	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316244-07A	Vial HCl preserved	A	NA		2.7	Y	Absent		NYTCL-8260(14)
L2316244-07B	Vial HCl preserved	A	NA		2.7	Y	Absent		NYTCL-8260(14)
L2316244-07C	Vial HCl preserved	A	NA		2.7	Y	Absent		NYTCL-8260(14)
L2316244-07D	Amber 120ml unpreserved	A	7	7	2.7	Y	Absent		NYTCL-8082-LVI(365)
L2316244-07E	Amber 120ml unpreserved	A	7	7	2.7	Y	Absent		NYTCL-8082-LVI(365)
L2316244-07F	Amber 120ml unpreserved	A	7	7	2.7	Y	Absent		NYTCL-8081(7)
L2316244-07G	Amber 120ml unpreserved	A	7	7	2.7	Y	Absent		NYTCL-8081(7)
L2316244-07H	Plastic 250ml HNO3 preserved	A	<2	<2	2.7	Y	Absent		TL-6020T(180),BA-6020T(180),SE-6020T(180),FE-6020T(180),K-6020T(180),CA-6020T(180),CR-6020T(180),NI-6020T(180),CU-6020T(180),NA-6020T(180),ZN-6020T(180),PB-6020T(180),MN-6020T(180),BE-6020T(180),V-6020T(180),AS-6020T(180),SB-6020T(180),AG-6020T(180),AL-6020T(180),CD-6020T(180),HG-T(28),MG-6020T(180),CO-6020T(180)
L2316244-07I	Plastic 250ml NaOH preserved	A	>12	>12	2.7	Y	Absent		TCN-9010(14)
L2316244-07J	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L2316244-07K	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L2316244-07L	Plastic 500ml unpreserved	A	7	7	2.7	Y	Absent		HEXCR-7196(1)
L2316244-07M	Amber 1000ml unpreserved	A	7	7	2.7	Y	Absent		HERB-APA(7)
L2316244-07N	Amber 1000ml unpreserved	A	7	7	2.7	Y	Absent		HERB-APA(7)
L2316244-08A	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)
L2316244-08B	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)
L2316244-10A	Vial MeOH preserved	B	NA		3.4	Y	Absent		HOLD-8260HLW(14)
L2316244-10B	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	HOLD-8260HLW(14)

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Serial_No:04042318:22
Lab Number: L2316244
Report Date: 04/04/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316244-10C	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	HOLD-8260HLW(14)
L2316244-11A	Vial MeOH preserved	B	NA		3.4	Y	Absent		HOLD-8260HLW(14)
L2316244-11B	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	HOLD-8260HLW(14)
L2316244-11C	Vial water preserved	B	NA		3.4	Y	Absent	29-MAR-23 04:53	HOLD-8260HLW(14)

Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Project Name: 2731 W 12TH STREET
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH STREET
Project Number: 170697301

Lab Number: L2316244
Report Date: 04/04/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 107 Alpha Analytical - In-house calculation method.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

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Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B


The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:**Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H-B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

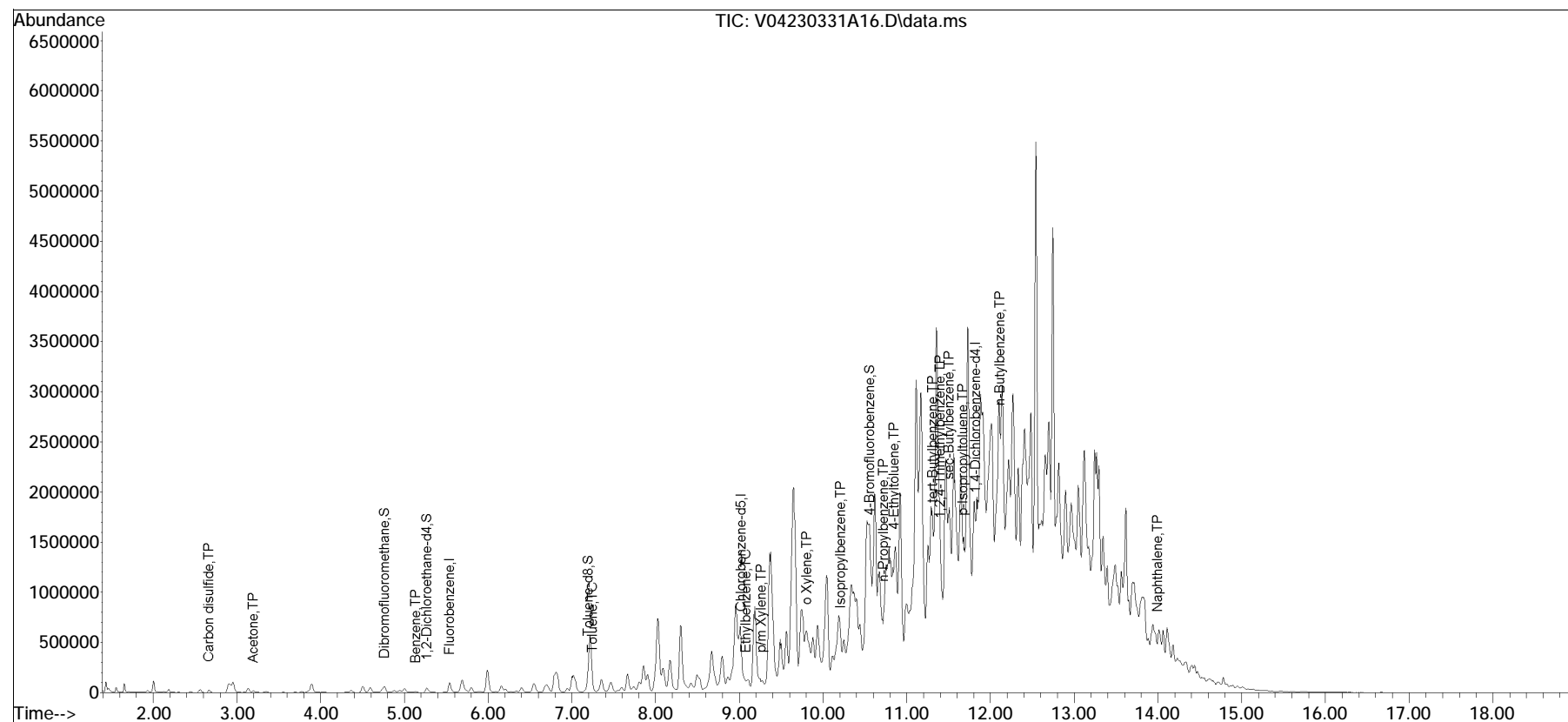
 NEW YORK CHAIN OF CUSTODY Westborough, MA 01581 8 Walkup Dr. TEL: 508-898-9220 FAX: 508-898-9193		Service Centers Mahwah, NJ 07430: 35 Whitney Rd, Suite 5 Albany, NY 12205: 14 Walker Way Tonawanda, NY 14150: 275 Cooper Ave, Suite 105		Page 1 of 1		Date Rec'd In Lab 3/29/23		ALPHA Job # 12316244																																																																																																																																																	
		Project Information Project Name: 2731 W 12th Street Project Location: Brooklyn, NY Project #: 170697301 (Use Project name as Project #) <input type="checkbox"/> Project Manager: Elizabeth Adkins ALPHAQuote #: Turn-Around Time Standard <input checked="" type="checkbox"/> Due Date: Rush (only if pre approved) <input type="checkbox"/> # of Days:		Deliverables <input type="checkbox"/> ASP-A <input checked="" type="checkbox"/> ASP-B <input type="checkbox"/> EQUIS (1 File) <input type="checkbox"/> EQUIS (4 File) <input type="checkbox"/> Other		Billing Information <input checked="" type="checkbox"/> Same as Client Info PO #																																																																																																																																																			
Client Information Client: Langan Address: 330 W 3rd St, NY, NY 10001 Phone: 212-471-5400 Fax: Email: eadkins@langan.com		Regulatory Requirement <input type="checkbox"/> NY TOGS <input checked="" type="checkbox"/> NY Part 375 <input type="checkbox"/> AWQ Standards <input type="checkbox"/> NY CP-51 <input type="checkbox"/> NY Restricted Use <input type="checkbox"/> Other <input type="checkbox"/> NY Unrestricted Use <input type="checkbox"/> NYC Sewer Discharge		Disposal Site Information Please identify below location of applicable disposal facilities. Disposal Facility: <input type="checkbox"/> NJ <input type="checkbox"/> NY <input type="checkbox"/> Other:																																																																																																																																																					
These samples have been previously analyzed by Alpha <input type="checkbox"/> Other project specific requirements/comments: cc: datamanagement@langan.com & lgrosec@langan.com						ANALYSIS part 375 TCL part 375 TCL pesticides & herbicides part 375 TCL metals (industrial & truckload) total cyanide PCBs		Sample Filtration <input type="checkbox"/> Done <input type="checkbox"/> Lab to do Preservation <input type="checkbox"/> Lab to do (Please Specify below) Sample Specific Comments																																																																																																																																																	
Please specify Metals or TAL.		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">ALPHA Lab ID (Lab Use Only)</th> <th rowspan="2">Sample ID</th> <th colspan="2">Collection</th> <th rowspan="2">Sample Matrix</th> <th rowspan="2">Sampler's Initials</th> <th colspan="8"></th> </tr> <tr> <th>Date</th> <th>Time</th> <th colspan="8"></th> </tr> </thead> <tbody> <tr> <td>16244-01</td> <td>SP08-0-2</td> <td>03/28/23</td> <td>15:20</td> <td>S</td> <td>CQ</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>02</td> <td>SB08-12-14</td> <td></td> <td>16:10</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>03</td> <td>SB09-2-4</td> <td></td> <td>12:05</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>04</td> <td>SB09-12-13.5</td> <td></td> <td>12:15</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>05</td> <td>SB12-0-2</td> <td></td> <td>14:15</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>06</td> <td>SB12-13.5-15</td> <td></td> <td>14:35</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>07</td> <td>SB01-032823</td> <td></td> <td>16:15</td> <td>AO</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>08</td> <td>SB01-032823</td> <td></td> <td>16:25</td> <td>AO</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>								ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials									Date	Time									16244-01	SP08-0-2	03/28/23	15:20	S	CQ	X	X	X	X	X	X	X			02	SB08-12-14		16:10			X	X	X	X	X	X	X			03	SB09-2-4		12:05			X	X	X	X	X	X	X			04	SB09-12-13.5		12:15			X	X	X	X	X	X	X			05	SB12-0-2		14:15			X	X	X	X	X	X	X			06	SB12-13.5-15		14:35			X	X	X	X	X	X	X			07	SB01-032823		16:15	AO		X	X	X	X	X	X	X			08	SB01-032823		16:25	AO		X	X	X	X	X	X	X		
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Preservative Code: A = None B = HCl C = HNO ₃ D = H ₂ SO ₄ E = NaOH F = MeOH G = NaHSO ₄ H = Na ₂ S ₂ O ₃ K/E = Zn Ac/NaOH O = Other		Container Code P = Plastic A = Amber Glass V = Vial G = Glass B = Bacteria Cup C = Cube O = Other E = Encore D = BOD Bottle		Westboro: Certification No: MA935 Mansfield: Certification No: MA015		Container Type Preservative		Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)																																																																																																																																																	
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Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA104\2023\230331A\
 Data File : V04230331A16.D
 Acq On : 31 Mar 2023 1:45 pm
 Operator : VOA104:JIC
 Sample : L2316244-04,31,3.48,5,,C
 Misc : WG1762102,ICAL19666
 ALS Vial : 16 Sample Multiplier: 1

Quant Time: Apr 03 09:59:26 2023
 Quant Method : I:\VOLATILES\VOA104\2023\230331A\V104_230118A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jan 19 14:20:58 2023
 Response via : Initial Calibration

Sub List : 8260-NYTCL - Megamix plus Diox30331A\V04230331A01.D•





ANALYTICAL REPORT

Lab Number:	L2316548
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Elizabeth Adkins
Phone:	(212) 479-5400
Project Name:	2731 W 12TH ST
Project Number:	170697301
Report Date:	04/12/23

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2316548-01	SB04_2-4	SOIL	BROOKLYN, NY	03/29/23 09:40	03/29/23
L2316548-02	SB04_13-15	SOIL	BROOKLYN, NY	03/29/23 09:50	03/29/23
L2316548-03	SB03_B_2-4	SOIL	BROOKLYN, NY	03/29/23 12:30	03/29/23
L2316548-04	SB03_B_14-16	SOIL	BROOKLYN, NY	03/29/23 13:05	03/29/23
L2316548-05	SB07_0-2	SOIL	BROOKLYN, NY	03/29/23 15:55	03/29/23
L2316548-06	SB07_5-6.5	SOIL	BROOKLYN, NY	03/29/23 16:05	03/29/23
L2316548-07	SB06_0-2	SOIL	BROOKLYN, NY	03/29/23 17:40	03/29/23
L2316548-08	SB06_12-14	SOIL	BROOKLYN, NY	03/29/23 18:00	03/29/23

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Case Narrative (continued)

Report Submission

April 12, 2023: This final report includes the results of all requested analyses.

April 05, 2023: This is a preliminary report.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2316548-03 and -04: The Client IDs were changed at the client's request.

Volatile Organics

L2316548-06: The sample was analyzed as a High Level Methanol based upon screen results. The sample was then analyzed as a Low Level in order to achieve lower reporting limits. The results of both analyses are reported. Differences were noted between the results of the analyses which have been attributed to vial discrepancies.

Semivolatile Organics

L2316548-02D: The surrogate recoveries are below the acceptance criteria for 2-fluorophenol (0%), phenol-d6 (0%), nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%), 2,4,6-tribromophenol (0%), and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

PCBs

L2316548-08: The internal standard (IS) response for 1-bromo-2-nitrobenzene (247%) was above the acceptance criteria on column B; however, the sample was not re-analyzed due to obvious interferences. The surrogate recoveries are outside the method acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (23%) and decachlorobiphenyl (25%) due to interference with the Internal Standard.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Case Narrative (continued)

Total Metals

L2316548-01, -02, and -05 through -08: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

The WG1760842-3/-4 MS/MSD recoveries for aluminum (0%/0%), iron (0%/0%), magnesium (227%/20%), and potassium (42%/70%), performed on L2316548-07, do not apply because the sample concentrations are greater than four times the spike amounts added.

The WG1760842-3/-4 MS/MSD recoveries, performed on L2316548-07, are outside the acceptance criteria for calcium (405%/5%) and manganese (MSD 67%). A post digestion spike was performed and was within acceptance criteria.

The WG1760842-3/-4 MS/MSD RPDs for calcium (83%) and magnesium (24%), performed on L2316548-07, are above the acceptance criteria.

Hexavalent Chromium

The WG1762488-2 LCS recovery for chromium, hexavalent (75%), associated with L2316548-01, -02, -05, -06, -07, and -08, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

The WG1762488-6 Soluble MS recovery for chromium, hexavalent (68%), performed on L2316548-07, was outside the acceptance criteria. This has been attributed to matrix interference. A post-spike was performed with a recovery of 91%.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Cristin Walker

Title: Technical Director/Representative

Date: 04/12/23

ORGANICS

VOLATILES

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01
Client ID: SB04_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 09:40
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 04/03/23 14:14
Analyst: AJK
Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	7.9	3.6	1
1,1-Dichloroethane	ND		ug/kg	1.6	0.23	1
Chloroform	ND		ug/kg	2.4	0.22	1
Carbon tetrachloride	ND		ug/kg	1.6	0.36	1
1,2-Dichloropropane	ND		ug/kg	1.6	0.20	1
Dibromochloromethane	ND		ug/kg	1.6	0.22	1
1,1,2-Trichloroethane	ND		ug/kg	1.6	0.42	1
Tetrachloroethene	ND		ug/kg	0.79	0.31	1
Chlorobenzene	ND		ug/kg	0.79	0.20	1
Trichlorofluoromethane	ND		ug/kg	6.3	1.1	1
1,2-Dichloroethane	ND		ug/kg	1.6	0.41	1
1,1,1-Trichloroethane	ND		ug/kg	0.79	0.26	1
Bromodichloromethane	ND		ug/kg	0.79	0.17	1
trans-1,3-Dichloropropene	ND		ug/kg	1.6	0.43	1
cis-1,3-Dichloropropene	ND		ug/kg	0.79	0.25	1
1,3-Dichloropropene, Total	ND		ug/kg	0.79	0.25	1
1,1-Dichloropropene	ND		ug/kg	0.79	0.25	1
Bromoform	ND		ug/kg	6.3	0.39	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.79	0.26	1
Benzene	0.30	J	ug/kg	0.79	0.26	1
Toluene	ND		ug/kg	1.6	0.86	1
Ethylbenzene	0.64	J	ug/kg	1.6	0.22	1
Chloromethane	ND		ug/kg	6.3	1.5	1
Bromomethane	ND		ug/kg	3.2	0.92	1
Vinyl chloride	ND		ug/kg	1.6	0.53	1
Chloroethane	ND		ug/kg	3.2	0.72	1
1,1-Dichloroethene	ND		ug/kg	1.6	0.38	1
trans-1,2-Dichloroethene	ND		ug/kg	2.4	0.22	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01

Date Collected: 03/29/23 09:40

Client ID: SB04_2-4

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.79	0.22	1
1,2-Dichlorobenzene	ND		ug/kg	3.2	0.23	1
1,3-Dichlorobenzene	ND		ug/kg	3.2	0.23	1
1,4-Dichlorobenzene	ND		ug/kg	3.2	0.27	1
Methyl tert butyl ether	ND		ug/kg	3.2	0.32	1
p/m-Xylene	ND		ug/kg	3.2	0.89	1
o-Xylene	ND		ug/kg	1.6	0.46	1
Xylenes, Total	ND		ug/kg	1.6	0.46	1
cis-1,2-Dichloroethene	ND		ug/kg	1.6	0.28	1
1,2-Dichloroethene, Total	ND		ug/kg	1.6	0.22	1
Dibromomethane	ND		ug/kg	3.2	0.38	1
Styrene	ND		ug/kg	1.6	0.31	1
Dichlorodifluoromethane	ND		ug/kg	16	1.4	1
Acetone	25		ug/kg	16	7.6	1
Carbon disulfide	ND		ug/kg	16	7.2	1
2-Butanone	ND		ug/kg	16	3.5	1
Vinyl acetate	ND		ug/kg	16	3.4	1
4-Methyl-2-pentanone	ND		ug/kg	16	2.0	1
1,2,3-Trichloropropane	ND		ug/kg	3.2	0.20	1
2-Hexanone	ND		ug/kg	16	1.9	1
Bromochloromethane	ND		ug/kg	3.2	0.32	1
2,2-Dichloropropane	ND		ug/kg	3.2	0.32	1
1,2-Dibromoethane	ND		ug/kg	1.6	0.44	1
1,3-Dichloropropane	ND		ug/kg	3.2	0.26	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.79	0.21	1
Bromobenzene	ND		ug/kg	3.2	0.23	1
n-Butylbenzene	ND		ug/kg	1.6	0.26	1
sec-Butylbenzene	ND		ug/kg	1.6	0.23	1
tert-Butylbenzene	ND		ug/kg	3.2	0.19	1
o-Chlorotoluene	ND		ug/kg	3.2	0.30	1
p-Chlorotoluene	ND		ug/kg	3.2	0.17	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.8	1.6	1
Hexachlorobutadiene	ND		ug/kg	6.3	0.27	1
Isopropylbenzene	0.22	J	ug/kg	1.6	0.17	1
p-Isopropyltoluene	0.94	J	ug/kg	1.6	0.17	1
Naphthalene	8.0		ug/kg	6.3	1.0	1
Acrylonitrile	ND		ug/kg	6.3	1.8	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01
Client ID: SB04_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 09:40
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	ND		ug/kg	1.6	0.27	1
1,2,3-Trichlorobenzene	ND		ug/kg	3.2	0.51	1
1,2,4-Trichlorobenzene	ND		ug/kg	3.2	0.43	1
1,3,5-Trimethylbenzene	ND		ug/kg	3.2	0.31	1
1,2,4-Trimethylbenzene	ND		ug/kg	3.2	0.53	1
1,4-Dioxane	ND		ug/kg	130	56.	1
p-Diethylbenzene	ND		ug/kg	3.2	0.28	1
p-Ethyltoluene	ND		ug/kg	3.2	0.61	1
1,2,4,5-Tetramethylbenzene	0.39	J	ug/kg	3.2	0.30	1
Ethyl ether	ND		ug/kg	3.2	0.54	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	7.9	2.2	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	86		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	112		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-02 D2

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8260D

Analytical Date: 04/05/23 09:46

Analyst: AJK

Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	8500	3900	25
1,1-Dichloroethane	ND		ug/kg	1700	240	25
Chloroform	ND		ug/kg	2500	240	25
Carbon tetrachloride	ND		ug/kg	1700	390	25
1,2-Dichloropropane	ND		ug/kg	1700	210	25
Dibromochloromethane	ND		ug/kg	1700	240	25
1,1,2-Trichloroethane	ND		ug/kg	1700	450	25
Tetrachloroethene	ND		ug/kg	850	330	25
Chlorobenzene	ND		ug/kg	850	210	25
Trichlorofluoromethane	ND		ug/kg	6800	1200	25
1,2-Dichloroethane	ND		ug/kg	1700	430	25
1,1,1-Trichloroethane	ND		ug/kg	850	280	25
Bromodichloromethane	ND		ug/kg	850	180	25
trans-1,3-Dichloropropene	ND		ug/kg	1700	460	25
cis-1,3-Dichloropropene	ND		ug/kg	850	270	25
1,3-Dichloropropene, Total	ND		ug/kg	850	270	25
1,1-Dichloropropene	ND		ug/kg	850	270	25
Bromoform	ND		ug/kg	6800	420	25
1,1,2,2-Tetrachloroethane	ND		ug/kg	850	280	25
Benzene	11000		ug/kg	850	280	25
Toluene	ND		ug/kg	1700	920	25
Ethylbenzene	18000		ug/kg	1700	240	25
Chloromethane	ND		ug/kg	6800	1600	25
Bromomethane	ND		ug/kg	3400	980	25
Vinyl chloride	ND		ug/kg	1700	570	25
Chloroethane	ND		ug/kg	3400	760	25
1,1-Dichloroethene	ND		ug/kg	1700	400	25
trans-1,2-Dichloroethene	ND		ug/kg	2500	230	25

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-02 D2

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	850	230	25
1,2-Dichlorobenzene	ND		ug/kg	3400	240	25
1,3-Dichlorobenzene	ND		ug/kg	3400	250	25
1,4-Dichlorobenzene	ND		ug/kg	3400	290	25
Methyl tert butyl ether	ND		ug/kg	3400	340	25
p/m-Xylene	11000		ug/kg	3400	950	25
o-Xylene	9000		ug/kg	1700	490	25
Xylenes, Total	20000		ug/kg	1700	490	25
cis-1,2-Dichloroethene	ND		ug/kg	1700	300	25
1,2-Dichloroethene, Total	ND		ug/kg	1700	230	25
Dibromomethane	ND		ug/kg	3400	400	25
Styrene	ND		ug/kg	1700	330	25
Dichlorodifluoromethane	ND		ug/kg	17000	1500	25
Acetone	ND		ug/kg	17000	8100	25
Carbon disulfide	ND		ug/kg	17000	7700	25
2-Butanone	ND		ug/kg	17000	3800	25
Vinyl acetate	ND		ug/kg	17000	3600	25
4-Methyl-2-pentanone	ND		ug/kg	17000	2200	25
1,2,3-Trichloropropane	ND		ug/kg	3400	210	25
2-Hexanone	ND		ug/kg	17000	2000	25
Bromochloromethane	ND		ug/kg	3400	350	25
2,2-Dichloropropane	ND		ug/kg	3400	340	25
1,2-Dibromoethane	ND		ug/kg	1700	470	25
1,3-Dichloropropane	ND		ug/kg	3400	280	25
1,1,1,2-Tetrachloroethane	ND		ug/kg	850	220	25
Bromobenzene	ND		ug/kg	3400	240	25
n-Butylbenzene	280	J	ug/kg	1700	280	25
sec-Butylbenzene	ND		ug/kg	1700	250	25
tert-Butylbenzene	ND		ug/kg	3400	200	25
o-Chlorotoluene	ND		ug/kg	3400	320	25
p-Chlorotoluene	ND		ug/kg	3400	180	25
1,2-Dibromo-3-chloropropane	ND		ug/kg	5100	1700	25
Hexachlorobutadiene	ND		ug/kg	6800	290	25
Isopropylbenzene	1600	J	ug/kg	1700	180	25
p-Isopropyltoluene	830	J	ug/kg	1700	180	25
Naphthalene	540000	E	ug/kg	6800	1100	25
Acrylonitrile	ND		ug/kg	6800	1900	25

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-02 D2

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	560	J	ug/kg	1700	290	25
1,2,3-Trichlorobenzene	ND		ug/kg	3400	540	25
1,2,4-Trichlorobenzene	ND		ug/kg	3400	460	25
1,3,5-Trimethylbenzene	2400	J	ug/kg	3400	330	25
1,2,4-Trimethylbenzene	14000		ug/kg	3400	560	25
1,4-Dioxane	ND		ug/kg	140000	59000	25
p-Diethylbenzene	2200	J	ug/kg	3400	300	25
p-Ethyltoluene	7200		ug/kg	3400	650	25
1,2,4,5-Tetramethylbenzene	2000	J	ug/kg	3400	320	25
Ethyl ether	ND		ug/kg	3400	580	25
trans-1,4-Dichloro-2-butene	ND		ug/kg	8500	2400	25

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	106		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-02 D

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8260D

Analytical Date: 04/04/23 23:19

Analyst: JIC

Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab

Naphthalene	630000		ug/kg	14000	2200	50
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	110		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-05
Client ID: SB07_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 15:55
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 04/03/23 14:40
Analyst: AJK
Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	5.4	2.5	1
1,1-Dichloroethane	ND		ug/kg	1.1	0.16	1
Chloroform	ND		ug/kg	1.6	0.15	1
Carbon tetrachloride	ND		ug/kg	1.1	0.25	1
1,2-Dichloropropane	ND		ug/kg	1.1	0.14	1
Dibromochloromethane	ND		ug/kg	1.1	0.15	1
1,1,2-Trichloroethane	ND		ug/kg	1.1	0.29	1
Tetrachloroethene	ND		ug/kg	0.54	0.21	1
Chlorobenzene	ND		ug/kg	0.54	0.14	1
Trichlorofluoromethane	ND		ug/kg	4.4	0.76	1
1,2-Dichloroethane	ND		ug/kg	1.1	0.28	1
1,1,1-Trichloroethane	ND		ug/kg	0.54	0.18	1
Bromodichloromethane	ND		ug/kg	0.54	0.12	1
trans-1,3-Dichloropropene	ND		ug/kg	1.1	0.30	1
cis-1,3-Dichloropropene	ND		ug/kg	0.54	0.17	1
1,3-Dichloropropene, Total	ND		ug/kg	0.54	0.17	1
1,1-Dichloropropene	ND		ug/kg	0.54	0.17	1
Bromoform	ND		ug/kg	4.4	0.27	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.54	0.18	1
Benzene	ND		ug/kg	0.54	0.18	1
Toluene	ND		ug/kg	1.1	0.59	1
Ethylbenzene	ND		ug/kg	1.1	0.15	1
Chloromethane	ND		ug/kg	4.4	1.0	1
Bromomethane	ND		ug/kg	2.2	0.63	1
Vinyl chloride	ND		ug/kg	1.1	0.36	1
Chloroethane	ND		ug/kg	2.2	0.49	1
1,1-Dichloroethene	ND		ug/kg	1.1	0.26	1
trans-1,2-Dichloroethene	ND		ug/kg	1.6	0.15	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-05
Client ID: SB07_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 15:55
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.54	0.15	1
1,2-Dichlorobenzene	ND		ug/kg	2.2	0.16	1
1,3-Dichlorobenzene	ND		ug/kg	2.2	0.16	1
1,4-Dichlorobenzene	ND		ug/kg	2.2	0.19	1
Methyl tert butyl ether	ND		ug/kg	2.2	0.22	1
p/m-Xylene	ND		ug/kg	2.2	0.61	1
o-Xylene	ND		ug/kg	1.1	0.32	1
Xylenes, Total	ND		ug/kg	1.1	0.32	1
cis-1,2-Dichloroethene	ND		ug/kg	1.1	0.19	1
1,2-Dichloroethene, Total	ND		ug/kg	1.1	0.15	1
Dibromomethane	ND		ug/kg	2.2	0.26	1
Styrene	ND		ug/kg	1.1	0.21	1
Dichlorodifluoromethane	ND		ug/kg	11	1.0	1
Acetone	ND		ug/kg	11	5.2	1
Carbon disulfide	ND		ug/kg	11	5.0	1
2-Butanone	ND		ug/kg	11	2.4	1
Vinyl acetate	ND		ug/kg	11	2.3	1
4-Methyl-2-pentanone	ND		ug/kg	11	1.4	1
1,2,3-Trichloropropane	ND		ug/kg	2.2	0.14	1
2-Hexanone	ND		ug/kg	11	1.3	1
Bromochloromethane	ND		ug/kg	2.2	0.22	1
2,2-Dichloropropane	ND		ug/kg	2.2	0.22	1
1,2-Dibromoethane	ND		ug/kg	1.1	0.30	1
1,3-Dichloropropane	ND		ug/kg	2.2	0.18	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.54	0.14	1
Bromobenzene	ND		ug/kg	2.2	0.16	1
n-Butylbenzene	ND		ug/kg	1.1	0.18	1
sec-Butylbenzene	ND		ug/kg	1.1	0.16	1
tert-Butylbenzene	ND		ug/kg	2.2	0.13	1
o-Chlorotoluene	ND		ug/kg	2.2	0.21	1
p-Chlorotoluene	ND		ug/kg	2.2	0.12	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.3	1.1	1
Hexachlorobutadiene	ND		ug/kg	4.4	0.18	1
Isopropylbenzene	ND		ug/kg	1.1	0.12	1
p-Isopropyltoluene	ND		ug/kg	1.1	0.12	1
Naphthalene	ND		ug/kg	4.4	0.71	1
Acrylonitrile	ND		ug/kg	4.4	1.2	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-05
Client ID: SB07_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 15:55
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	ND		ug/kg	1.1	0.19	1
1,2,3-Trichlorobenzene	ND		ug/kg	2.2	0.35	1
1,2,4-Trichlorobenzene	ND		ug/kg	2.2	0.30	1
1,3,5-Trimethylbenzene	ND		ug/kg	2.2	0.21	1
1,2,4-Trimethylbenzene	ND		ug/kg	2.2	0.36	1
1,4-Dioxane	ND		ug/kg	87	38.	1
p-Diethylbenzene	ND		ug/kg	2.2	0.19	1
p-Ethyltoluene	ND		ug/kg	2.2	0.42	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.2	0.21	1
Ethyl ether	ND		ug/kg	2.2	0.37	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.4	1.5	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	108		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	100		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-06
 Client ID: SB07_5-6.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/04/23 22:39
 Analyst: JIC
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	440	200	1
1,1-Dichloroethane	ND		ug/kg	87	13.	1
Chloroform	ND		ug/kg	130	12.	1
Carbon tetrachloride	ND		ug/kg	87	20.	1
1,2-Dichloropropane	ND		ug/kg	87	11.	1
Dibromochloromethane	ND		ug/kg	87	12.	1
1,1,2-Trichloroethane	ND		ug/kg	87	23.	1
Tetrachloroethene	ND		ug/kg	44	17.	1
Chlorobenzene	ND		ug/kg	44	11.	1
Trichlorofluoromethane	ND		ug/kg	350	60.	1
1,2-Dichloroethane	ND		ug/kg	87	22.	1
1,1,1-Trichloroethane	ND		ug/kg	44	14.	1
Bromodichloromethane	ND		ug/kg	44	9.5	1
trans-1,3-Dichloropropene	ND		ug/kg	87	24.	1
cis-1,3-Dichloropropene	ND		ug/kg	44	14.	1
1,3-Dichloropropene, Total	ND		ug/kg	44	14.	1
1,1-Dichloropropene	ND		ug/kg	44	14.	1
Bromoform	ND		ug/kg	350	21.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	44	14.	1
Benzene	81		ug/kg	44	14.	1
Toluene	ND		ug/kg	87	47.	1
Ethylbenzene	84	J	ug/kg	87	12.	1
Chloromethane	ND		ug/kg	350	81.	1
Bromomethane	ND		ug/kg	170	50.	1
Vinyl chloride	ND		ug/kg	87	29.	1
Chloroethane	ND		ug/kg	170	39.	1
1,1-Dichloroethene	ND		ug/kg	87	21.	1
trans-1,2-Dichloroethene	ND		ug/kg	130	12.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-06
Client ID: SB07_5-6.5
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	44	12.	1
1,2-Dichlorobenzene	ND		ug/kg	170	12.	1
1,3-Dichlorobenzene	ND		ug/kg	170	13.	1
1,4-Dichlorobenzene	ND		ug/kg	170	15.	1
Methyl tert butyl ether	ND		ug/kg	170	17.	1
p/m-Xylene	ND		ug/kg	170	49.	1
o-Xylene	ND		ug/kg	87	25.	1
Xylenes, Total	ND		ug/kg	87	25.	1
cis-1,2-Dichloroethene	ND		ug/kg	87	15.	1
1,2-Dichloroethene, Total	ND		ug/kg	87	12.	1
Dibromomethane	ND		ug/kg	170	21.	1
Styrene	30	J	ug/kg	87	17.	1
Dichlorodifluoromethane	ND		ug/kg	870	80.	1
Acetone	ND		ug/kg	870	420	1
Carbon disulfide	ND		ug/kg	870	400	1
2-Butanone	ND		ug/kg	870	190	1
Vinyl acetate	ND		ug/kg	870	190	1
4-Methyl-2-pentanone	ND		ug/kg	870	110	1
1,2,3-Trichloropropane	ND		ug/kg	170	11.	1
2-Hexanone	ND		ug/kg	870	100	1
Bromochloromethane	ND		ug/kg	170	18.	1
2,2-Dichloropropane	ND		ug/kg	170	18.	1
1,2-Dibromoethane	ND		ug/kg	87	24.	1
1,3-Dichloropropane	ND		ug/kg	170	14.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	44	11.	1
Bromobenzene	ND		ug/kg	170	13.	1
n-Butylbenzene	ND		ug/kg	87	14.	1
sec-Butylbenzene	ND		ug/kg	87	13.	1
tert-Butylbenzene	ND		ug/kg	170	10.	1
o-Chlorotoluene	ND		ug/kg	170	17.	1
p-Chlorotoluene	ND		ug/kg	170	9.4	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	260	87.	1
Hexachlorobutadiene	ND		ug/kg	350	15.	1
Isopropylbenzene	15	J	ug/kg	87	9.5	1
p-Isopropyltoluene	52	J	ug/kg	87	9.5	1
Naphthalene	950		ug/kg	350	56.	1
Acrylonitrile	ND		ug/kg	350	100	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS****Lab ID:** L2316548-06**Date Collected:** 03/29/23 16:05**Client ID:** SB07_5-6.5**Date Received:** 03/29/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	ND		ug/kg	87	15.	1
1,2,3-Trichlorobenzene	ND		ug/kg	170	28.	1
1,2,4-Trichlorobenzene	ND		ug/kg	170	24.	1
1,3,5-Trimethylbenzene	ND		ug/kg	170	17.	1
1,2,4-Trimethylbenzene	39	J	ug/kg	170	29.	1
1,4-Dioxane	ND		ug/kg	7000	3000	1
p-Diethylbenzene	45	J	ug/kg	170	15.	1
p-Ethyltoluene	59	J	ug/kg	170	33.	1
1,2,4,5-Tetramethylbenzene	31	J	ug/kg	170	17.	1
Ethyl ether	ND		ug/kg	170	30.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	440	120	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-06
 Client ID: SB07_5-6.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/04/23 22:59
 Analyst: JIC
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	8.3	3.8	1
1,1-Dichloroethane	ND		ug/kg	1.6	0.24	1
Chloroform	ND		ug/kg	2.5	0.23	1
Carbon tetrachloride	ND		ug/kg	1.6	0.38	1
1,2-Dichloropropane	ND		ug/kg	1.6	0.21	1
Dibromochloromethane	ND		ug/kg	1.6	0.23	1
1,1,2-Trichloroethane	ND		ug/kg	1.6	0.44	1
Tetrachloroethene	ND		ug/kg	0.83	0.32	1
Chlorobenzene	ND		ug/kg	0.83	0.21	1
Trichlorofluoromethane	ND		ug/kg	6.6	1.2	1
1,2-Dichloroethane	ND		ug/kg	1.6	0.43	1
1,1,1-Trichloroethane	ND		ug/kg	0.83	0.28	1
Bromodichloromethane	ND		ug/kg	0.83	0.18	1
trans-1,3-Dichloropropene	ND		ug/kg	1.6	0.45	1
cis-1,3-Dichloropropene	ND		ug/kg	0.83	0.26	1
1,3-Dichloropropene, Total	ND		ug/kg	0.83	0.26	1
1,1-Dichloropropene	ND		ug/kg	0.83	0.26	1
Bromoform	ND		ug/kg	6.6	0.41	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.83	0.28	1
Benzene	2.7		ug/kg	0.83	0.28	1
Toluene	1.7		ug/kg	1.6	0.90	1
Ethylbenzene	10		ug/kg	1.6	0.23	1
Chloromethane	ND		ug/kg	6.6	1.5	1
Bromomethane	ND		ug/kg	3.3	0.96	1
Vinyl chloride	ND		ug/kg	1.6	0.56	1
Chloroethane	ND		ug/kg	3.3	0.75	1
1,1-Dichloroethene	ND		ug/kg	1.6	0.39	1
trans-1,2-Dichloroethene	ND		ug/kg	2.5	0.23	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-06
 Client ID: SB07_5-6.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.83	0.23	1
1,2-Dichlorobenzene	0.58	J	ug/kg	3.3	0.24	1
1,3-Dichlorobenzene	ND		ug/kg	3.3	0.24	1
1,4-Dichlorobenzene	0.67	J	ug/kg	3.3	0.28	1
Methyl tert butyl ether	ND		ug/kg	3.3	0.33	1
p/m-Xylene	3.8		ug/kg	3.3	0.93	1
o-Xylene	2.7		ug/kg	1.6	0.48	1
Xylenes, Total	6.5		ug/kg	1.6	0.48	1
cis-1,2-Dichloroethene	ND		ug/kg	1.6	0.29	1
1,2-Dichloroethene, Total	ND		ug/kg	1.6	0.23	1
Dibromomethane	ND		ug/kg	3.3	0.39	1
Styrene	2.3		ug/kg	1.6	0.32	1
Dichlorodifluoromethane	ND		ug/kg	16	1.5	1
Acetone	32		ug/kg	16	8.0	1
Carbon disulfide	18		ug/kg	16	7.6	1
2-Butanone	6.8	J	ug/kg	16	3.7	1
Vinyl acetate	ND		ug/kg	16	3.6	1
4-Methyl-2-pentanone	ND		ug/kg	16	2.1	1
1,2,3-Trichloropropane	ND		ug/kg	3.3	0.21	1
2-Hexanone	ND		ug/kg	16	2.0	1
Bromochloromethane	ND		ug/kg	3.3	0.34	1
2,2-Dichloropropane	ND		ug/kg	3.3	0.34	1
1,2-Dibromoethane	ND		ug/kg	1.6	0.46	1
1,3-Dichloropropane	ND		ug/kg	3.3	0.28	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.83	0.22	1
Bromobenzene	ND		ug/kg	3.3	0.24	1
n-Butylbenzene	0.80	J	ug/kg	1.6	0.28	1
sec-Butylbenzene	0.66	J	ug/kg	1.6	0.24	1
tert-Butylbenzene	ND		ug/kg	3.3	0.20	1
o-Chlorotoluene	ND		ug/kg	3.3	0.32	1
p-Chlorotoluene	ND		ug/kg	3.3	0.18	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	1.6	1
Hexachlorobutadiene	ND		ug/kg	6.6	0.28	1
Isopropylbenzene	4.2		ug/kg	1.6	0.18	1
p-Isopropyltoluene	11		ug/kg	1.6	0.18	1
Naphthalene	160		ug/kg	6.6	1.1	1
Acrylonitrile	ND		ug/kg	6.6	1.9	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-06
Client ID: SB07_5-6.5
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	1.6		ug/kg	1.6	0.28	1
1,2,3-Trichlorobenzene	ND		ug/kg	3.3	0.53	1
1,2,4-Trichlorobenzene	0.52	J	ug/kg	3.3	0.45	1
1,3,5-Trimethylbenzene	4.1		ug/kg	3.3	0.32	1
1,2,4-Trimethylbenzene	12		ug/kg	3.3	0.55	1
1,4-Dioxane	ND		ug/kg	130	58.	1
p-Diethylbenzene	8.1		ug/kg	3.3	0.29	1
p-Ethyltoluene	12		ug/kg	3.3	0.64	1
1,2,4,5-Tetramethylbenzene	6.5		ug/kg	3.3	0.32	1
Ethyl ether	ND		ug/kg	3.3	0.56	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	8.3	2.4	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	108		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07
Client ID: SB06_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 04/03/23 15:06
Analyst: AJK
Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	6.8	3.1	1
1,1-Dichloroethane	ND		ug/kg	1.4	0.20	1
Chloroform	ND		ug/kg	2.0	0.19	1
Carbon tetrachloride	ND		ug/kg	1.4	0.31	1
1,2-Dichloropropane	ND		ug/kg	1.4	0.17	1
Dibromochloromethane	ND		ug/kg	1.4	0.19	1
1,1,2-Trichloroethane	ND		ug/kg	1.4	0.36	1
Tetrachloroethene	ND		ug/kg	0.68	0.27	1
Chlorobenzene	ND		ug/kg	0.68	0.17	1
Trichlorofluoromethane	ND		ug/kg	5.5	0.95	1
1,2-Dichloroethane	ND		ug/kg	1.4	0.35	1
1,1,1-Trichloroethane	ND		ug/kg	0.68	0.23	1
Bromodichloromethane	ND		ug/kg	0.68	0.15	1
trans-1,3-Dichloropropene	ND		ug/kg	1.4	0.37	1
cis-1,3-Dichloropropene	ND		ug/kg	0.68	0.22	1
1,3-Dichloropropene, Total	ND		ug/kg	0.68	0.22	1
1,1-Dichloropropene	ND		ug/kg	0.68	0.22	1
Bromoform	ND		ug/kg	5.5	0.34	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.68	0.23	1
Benzene	ND		ug/kg	0.68	0.23	1
Toluene	ND		ug/kg	1.4	0.74	1
Ethylbenzene	ND		ug/kg	1.4	0.19	1
Chloromethane	ND		ug/kg	5.5	1.3	1
Bromomethane	ND		ug/kg	2.7	0.79	1
Vinyl chloride	ND		ug/kg	1.4	0.46	1
Chloroethane	ND		ug/kg	2.7	0.62	1
1,1-Dichloroethene	ND		ug/kg	1.4	0.32	1
trans-1,2-Dichloroethene	ND		ug/kg	2.0	0.19	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07
 Client ID: SB06_0-2
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.68	0.19	1
1,2-Dichlorobenzene	ND		ug/kg	2.7	0.20	1
1,3-Dichlorobenzene	ND		ug/kg	2.7	0.20	1
1,4-Dichlorobenzene	ND		ug/kg	2.7	0.23	1
Methyl tert butyl ether	ND		ug/kg	2.7	0.27	1
p/m-Xylene	ND		ug/kg	2.7	0.77	1
o-Xylene	ND		ug/kg	1.4	0.40	1
Xylenes, Total	ND		ug/kg	1.4	0.40	1
cis-1,2-Dichloroethene	ND		ug/kg	1.4	0.24	1
1,2-Dichloroethene, Total	ND		ug/kg	1.4	0.19	1
Dibromomethane	ND		ug/kg	2.7	0.32	1
Styrene	ND		ug/kg	1.4	0.27	1
Dichlorodifluoromethane	ND		ug/kg	14	1.2	1
Acetone	ND		ug/kg	14	6.6	1
Carbon disulfide	ND		ug/kg	14	6.2	1
2-Butanone	ND		ug/kg	14	3.0	1
Vinyl acetate	ND		ug/kg	14	2.9	1
4-Methyl-2-pentanone	ND		ug/kg	14	1.8	1
1,2,3-Trichloropropane	ND		ug/kg	2.7	0.17	1
2-Hexanone	ND		ug/kg	14	1.6	1
Bromochloromethane	ND		ug/kg	2.7	0.28	1
2,2-Dichloropropane	ND		ug/kg	2.7	0.28	1
1,2-Dibromoethane	ND		ug/kg	1.4	0.38	1
1,3-Dichloropropane	ND		ug/kg	2.7	0.23	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.68	0.18	1
Bromobenzene	ND		ug/kg	2.7	0.20	1
n-Butylbenzene	ND		ug/kg	1.4	0.23	1
sec-Butylbenzene	ND		ug/kg	1.4	0.20	1
tert-Butylbenzene	ND		ug/kg	2.7	0.16	1
o-Chlorotoluene	ND		ug/kg	2.7	0.26	1
p-Chlorotoluene	ND		ug/kg	2.7	0.15	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.1	1.4	1
Hexachlorobutadiene	ND		ug/kg	5.5	0.23	1
Isopropylbenzene	ND		ug/kg	1.4	0.15	1
p-Isopropyltoluene	ND		ug/kg	1.4	0.15	1
Naphthalene	ND		ug/kg	5.5	0.89	1
Acrylonitrile	ND		ug/kg	5.5	1.6	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07
Client ID: SB06_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	ND		ug/kg	1.4	0.23	1
1,2,3-Trichlorobenzene	ND		ug/kg	2.7	0.44	1
1,2,4-Trichlorobenzene	ND		ug/kg	2.7	0.37	1
1,3,5-Trimethylbenzene	ND		ug/kg	2.7	0.26	1
1,2,4-Trimethylbenzene	ND		ug/kg	2.7	0.46	1
1,4-Dioxane	ND		ug/kg	110	48.	1
p-Diethylbenzene	ND		ug/kg	2.7	0.24	1
p-Ethyltoluene	ND		ug/kg	2.7	0.52	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.7	0.26	1
Ethyl ether	ND		ug/kg	2.7	0.47	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	6.8	1.9	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	105		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-08
Client ID: SB06_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 18:00
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 04/03/23 16:24
Analyst: AJK
Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	400	180	1
1,1-Dichloroethane	ND		ug/kg	79	11.	1
Chloroform	ND		ug/kg	120	11.	1
Carbon tetrachloride	ND		ug/kg	79	18.	1
1,2-Dichloropropane	ND		ug/kg	79	9.9	1
Dibromochloromethane	ND		ug/kg	79	11.	1
1,1,2-Trichloroethane	ND		ug/kg	79	21.	1
Tetrachloroethene	ND		ug/kg	40	16.	1
Chlorobenzene	ND		ug/kg	40	10.	1
Trichlorofluoromethane	ND		ug/kg	320	55.	1
1,2-Dichloroethane	ND		ug/kg	79	20.	1
1,1,1-Trichloroethane	ND		ug/kg	40	13.	1
Bromodichloromethane	ND		ug/kg	40	8.6	1
trans-1,3-Dichloropropene	ND		ug/kg	79	22.	1
cis-1,3-Dichloropropene	ND		ug/kg	40	12.	1
1,3-Dichloropropene, Total	ND		ug/kg	40	12.	1
1,1-Dichloropropene	ND		ug/kg	40	13.	1
Bromoform	ND		ug/kg	320	19.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	40	13.	1
Benzene	7000		ug/kg	40	13.	1
Toluene	ND		ug/kg	79	43.	1
Ethylbenzene	900		ug/kg	79	11.	1
Chloromethane	ND		ug/kg	320	74.	1
Bromomethane	ND		ug/kg	160	46.	1
Vinyl chloride	ND		ug/kg	79	26.	1
Chloroethane	ND		ug/kg	160	36.	1
1,1-Dichloroethene	ND		ug/kg	79	19.	1
trans-1,2-Dichloroethene	ND		ug/kg	120	11.	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-08
 Client ID: SB06_12-14
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 18:00
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	40	11.	1
1,2-Dichlorobenzene	ND		ug/kg	160	11.	1
1,3-Dichlorobenzene	ND		ug/kg	160	12.	1
1,4-Dichlorobenzene	ND		ug/kg	160	14.	1
Methyl tert butyl ether	ND		ug/kg	160	16.	1
p/m-Xylene	1000		ug/kg	160	44.	1
o-Xylene	75	J	ug/kg	79	23.	1
Xylenes, Total	1100	J	ug/kg	79	23.	1
cis-1,2-Dichloroethene	ND		ug/kg	79	14.	1
1,2-Dichloroethene, Total	ND		ug/kg	79	11.	1
Dibromomethane	ND		ug/kg	160	19.	1
Styrene	ND		ug/kg	79	16.	1
Dichlorodifluoromethane	ND		ug/kg	790	72.	1
Acetone	ND		ug/kg	790	380	1
Carbon disulfide	ND		ug/kg	790	360	1
2-Butanone	ND		ug/kg	790	180	1
Vinyl acetate	ND		ug/kg	790	170	1
4-Methyl-2-pentanone	ND		ug/kg	790	100	1
1,2,3-Trichloropropane	ND		ug/kg	160	10.	1
2-Hexanone	ND		ug/kg	790	94.	1
Bromochloromethane	ND		ug/kg	160	16.	1
2,2-Dichloropropane	ND		ug/kg	160	16.	1
1,2-Dibromoethane	ND		ug/kg	79	22.	1
1,3-Dichloropropane	ND		ug/kg	160	13.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	40	10.	1
Bromobenzene	ND		ug/kg	160	11.	1
n-Butylbenzene	ND		ug/kg	79	13.	1
sec-Butylbenzene	ND		ug/kg	79	12.	1
tert-Butylbenzene	ND		ug/kg	160	9.4	1
o-Chlorotoluene	ND		ug/kg	160	15.	1
p-Chlorotoluene	ND		ug/kg	160	8.6	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	240	79.	1
Hexachlorobutadiene	ND		ug/kg	320	13.	1
Isopropylbenzene	38	J	ug/kg	79	8.6	1
p-Isopropyltoluene	ND		ug/kg	79	8.6	1
Naphthalene	20000		ug/kg	320	52.	1
Acrylonitrile	ND		ug/kg	320	91.	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-08
Client ID: SB06_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 18:00
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	15	J	ug/kg	79	14.	1
1,2,3-Trichlorobenzene	ND		ug/kg	160	26.	1
1,2,4-Trichlorobenzene	ND		ug/kg	160	22.	1
1,3,5-Trimethylbenzene	140	J	ug/kg	160	15.	1
1,2,4-Trimethylbenzene	570		ug/kg	160	26.	1
1,4-Dioxane	ND		ug/kg	6300	2800	1
p-Diethylbenzene	24	J	ug/kg	160	14.	1
p-Ethyltoluene	120	J	ug/kg	160	30.	1
1,2,4,5-Tetramethylbenzene	23	J	ug/kg	160	15.	1
Ethyl ether	ND		ug/kg	160	27.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	400	110	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	87		70-130
4-Bromofluorobenzene	112		70-130
Dibromofluoromethane	119		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:38
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1762469-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	39	J	ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:38
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1762469-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:38
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1762469-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	ND		ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	16	J	ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	138	Q	70-130
Toluene-d8	82		70-130
4-Bromofluorobenzene	85		70-130
Dibromofluoromethane	135	Q	70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:12
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,05,07 Batch: WG1762473-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	0.23	J	ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	ND		ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:12
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,05,07 Batch: WG1762473-5					
1,2-Dichlorobenzene	0.30	J	ug/kg	2.0	0.14
1,3-Dichlorobenzene	0.34	J	ug/kg	2.0	0.15
1,4-Dichlorobenzene	0.40	J	ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	0.44	J	ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	0.16	J	ug/kg	2.0	0.14
n-Butylbenzene	0.40	J	ug/kg	1.0	0.17
sec-Butylbenzene	0.25	J	ug/kg	1.0	0.15
tert-Butylbenzene	0.15	J	ug/kg	2.0	0.12
o-Chlorotoluene	0.21	J	ug/kg	2.0	0.19

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/03/23 11:12
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,05,07 Batch: WG1762473-5					
p-Chlorotoluene	0.23	J	ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	0.35	J	ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	0.28	J	ug/kg	1.0	0.11
Naphthalene	1.6	J	ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	0.19	J	ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	1.2	J	ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	0.96	J	ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	0.35	J	ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	0.51	J	ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	113		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06 Batch: WG1762962-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	ND		ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06 Batch: WG1762962-5					
1,2-Dichlorobenzene	ND		ug/kg	2.0	0.14
1,3-Dichlorobenzene	ND		ug/kg	2.0	0.15
1,4-Dichlorobenzene	ND		ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	ND		ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	ND		ug/kg	2.0	0.14
n-Butylbenzene	ND		ug/kg	1.0	0.17
sec-Butylbenzene	ND		ug/kg	1.0	0.15
tert-Butylbenzene	ND		ug/kg	2.0	0.12
o-Chlorotoluene	ND		ug/kg	2.0	0.19

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06 Batch: WG1762962-5					
p-Chlorotoluene	ND		ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	ND		ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	ND		ug/kg	1.0	0.11
Naphthalene	ND		ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	ND		ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	ND		ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	ND		ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	ND		ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	107		70-130



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02,06 Batch: WG1762965-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02,06 Batch: WG1762965-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/04/23 18:23
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02,06 Batch: WG1762965-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	ND		ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/05/23 08:39
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02 Batch: WG1763068-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02 Batch: WG1763068-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02 Batch: WG1763068-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	ND		ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	106		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1762469-3 WG1762469-4								
Methylene chloride	87		85		70-130	2		30
1,1-Dichloroethane	87		84		70-130	4		30
Chloroform	87		84		70-130	4		30
Carbon tetrachloride	104		100		70-130	4		30
1,2-Dichloropropane	78		88		70-130	12		30
Dibromochloromethane	83		96		70-130	15		30
1,1,2-Trichloroethane	81		85		70-130	5		30
Tetrachloroethene	92		94		70-130	2		30
Chlorobenzene	88		94		70-130	7		30
Trichlorofluoromethane	84		90		70-139	7		30
1,2-Dichloroethane	84		85		70-130	1		30
1,1,1-Trichloroethane	99		98		70-130	1		30
Bromodichloromethane	74		88		70-130	17		30
trans-1,3-Dichloropropene	83		83		70-130	0		30
cis-1,3-Dichloropropene	82		70		70-130	16		30
1,1-Dichloropropene	92		94		70-130	2		30
Bromoform	89		93		70-130	4		30
1,1,2,2-Tetrachloroethane	74		87		70-130	16		30
Benzene	91		93		70-130	2		30
Toluene	91		92		70-130	1		30
Ethylbenzene	88		94		70-130	7		30
Chloromethane	71		70		52-130	1		30
Bromomethane	88		88		57-147	0		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1762469-3 WG1762469-4								
Vinyl chloride	77		76		67-130	1		30
Chloroethane	89		88		50-151	1		30
1,1-Dichloroethene	91		88		65-135	3		30
trans-1,2-Dichloroethene	92		90		70-130	2		30
Trichloroethene	105		103		70-130	2		30
1,2-Dichlorobenzene	98		98		70-130	0		30
1,3-Dichlorobenzene	100		98		70-130	2		30
1,4-Dichlorobenzene	92		95		70-130	3		30
Methyl tert butyl ether	95		89		66-130	7		30
p/m-Xylene	95		94		70-130	1		30
o-Xylene	81		79		70-130	3		30
cis-1,2-Dichloroethene	89		91		70-130	2		30
Dibromomethane	80		88		70-130	10		30
Styrene	87		81		70-130	7		30
Dichlorodifluoromethane	76		75		30-146	1		30
Acetone	100		96		54-140	4		30
Carbon disulfide	141	Q	139	Q	59-130	1		30
2-Butanone	98		96		70-130	2		30
Vinyl acetate	89		91		70-130	2		30
4-Methyl-2-pentanone	85		89		70-130	5		30
1,2,3-Trichloropropane	77		88		68-130	13		30
2-Hexanone	89		93		70-130	4		30
Bromochloromethane	92		91		70-130	1		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1762469-3 WG1762469-4								
2,2-Dichloropropane	91		92		70-130	1		30
1,2-Dibromoethane	86		82		70-130	5		30
1,3-Dichloropropane	73		75		69-130	3		30
1,1,1,2-Tetrachloroethane	100		88		70-130	13		30
Bromobenzene	101		97		70-130	4		30
n-Butylbenzene	101		102		70-130	1		30
sec-Butylbenzene	96		101		70-130	5		30
tert-Butylbenzene	107		104		70-130	3		30
o-Chlorotoluene	87		98		70-130	12		30
p-Chlorotoluene	89		99		70-130	11		30
1,2-Dibromo-3-chloropropane	94		116		68-130	21		30
Hexachlorobutadiene	84		116		67-130	32	Q	30
Isopropylbenzene	103		99		70-130	4		30
p-Isopropyltoluene	107		106		70-130	1		30
Naphthalene	99		122		70-130	21		30
Acrylonitrile	96		94		70-130	2		30
n-Propylbenzene	104		98		70-130	6		30
1,2,3-Trichlorobenzene	97		118		70-130	20		30
1,2,4-Trichlorobenzene	84		120		70-130	35	Q	30
1,3,5-Trimethylbenzene	86		98		70-130	13		30
1,2,4-Trimethylbenzene	100		98		70-130	2		30
1,4-Dioxane	72		97		65-136	30		30
p-Diethylbenzene	104		105		70-130	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1762469-3 WG1762469-4								
p-Ethyltoluene	86		100		70-130	15		30
1,2,4,5-Tetramethylbenzene	98		124		70-130	23		30
Ethyl ether	88		86		67-130	2		30
trans-1,4-Dichloro-2-butene	88		93		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	88		91		70-130
Toluene-d8	93		96		70-130
4-Bromofluorobenzene	97		95		70-130
Dibromofluoromethane	90		90		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 Batch: WG1762473-3 WG1762473-4								
Methylene chloride	87		85		70-130	2		30
1,1-Dichloroethane	87		84		70-130	4		30
Chloroform	87		84		70-130	4		30
Carbon tetrachloride	104		100		70-130	4		30
1,2-Dichloropropane	78		88		70-130	12		30
Dibromochloromethane	83		96		70-130	15		30
1,1,2-Trichloroethane	81		85		70-130	5		30
Tetrachloroethene	92		94		70-130	2		30
Chlorobenzene	88		94		70-130	7		30
Trichlorofluoromethane	84		90		70-139	7		30
1,2-Dichloroethane	84		85		70-130	1		30
1,1,1-Trichloroethane	99		98		70-130	1		30
Bromodichloromethane	74		88		70-130	17		30
trans-1,3-Dichloropropene	83		83		70-130	0		30
cis-1,3-Dichloropropene	82		70		70-130	16		30
1,1-Dichloropropene	92		94		70-130	2		30
Bromoform	89		93		70-130	4		30
1,1,2,2-Tetrachloroethane	74		87		70-130	16		30
Benzene	91		93		70-130	2		30
Toluene	91		92		70-130	1		30
Ethylbenzene	88		94		70-130	7		30
Chloromethane	71		70		52-130	1		30
Bromomethane	88		88		57-147	0		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 Batch: WG1762473-3 WG1762473-4								
Vinyl chloride	77		76		67-130	1		30
Chloroethane	89		88		50-151	1		30
1,1-Dichloroethene	91		88		65-135	3		30
trans-1,2-Dichloroethene	92		90		70-130	2		30
Trichloroethene	105		103		70-130	2		30
1,2-Dichlorobenzene	98		98		70-130	0		30
1,3-Dichlorobenzene	100		98		70-130	2		30
1,4-Dichlorobenzene	92		95		70-130	3		30
Methyl tert butyl ether	95		89		66-130	7		30
p/m-Xylene	95		94		70-130	1		30
o-Xylene	81		79		70-130	3		30
cis-1,2-Dichloroethene	89		91		70-130	2		30
Dibromomethane	80		88		70-130	10		30
Styrene	87		81		70-130	7		30
Dichlorodifluoromethane	76		75		30-146	1		30
Acetone	100		96		54-140	4		30
Carbon disulfide	141	Q	139	Q	59-130	1		30
2-Butanone	98		96		70-130	2		30
Vinyl acetate	89		91		70-130	2		30
4-Methyl-2-pentanone	85		89		70-130	5		30
1,2,3-Trichloropropane	77		88		68-130	13		30
2-Hexanone	89		93		70-130	4		30
Bromochloromethane	92		91		70-130	1		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 Batch: WG1762473-3 WG1762473-4								
2,2-Dichloropropane	91		92		70-130	1		30
1,2-Dibromoethane	86		82		70-130	5		30
1,3-Dichloropropane	73		75		69-130	3		30
1,1,1,2-Tetrachloroethane	100		88		70-130	13		30
Bromobenzene	101		97		70-130	4		30
n-Butylbenzene	101		102		70-130	1		30
sec-Butylbenzene	96		101		70-130	5		30
tert-Butylbenzene	107		104		70-130	3		30
o-Chlorotoluene	87		98		70-130	12		30
p-Chlorotoluene	89		99		70-130	11		30
1,2-Dibromo-3-chloropropane	94		116		68-130	21		30
Hexachlorobutadiene	84		116		67-130	32	Q	30
Isopropylbenzene	103		99		70-130	4		30
p-Isopropyltoluene	107		106		70-130	1		30
Naphthalene	99		122		70-130	21		30
Acrylonitrile	96		94		70-130	2		30
n-Propylbenzene	104		98		70-130	6		30
1,2,3-Trichlorobenzene	97		118		70-130	20		30
1,2,4-Trichlorobenzene	84		120		70-130	35	Q	30
1,3,5-Trimethylbenzene	86		98		70-130	13		30
1,2,4-Trimethylbenzene	100		98		70-130	2		30
1,4-Dioxane	72		97		65-136	30		30
p-Diethylbenzene	104		105		70-130	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 Batch: WG1762473-3 WG1762473-4								
p-Ethyltoluene	86		100		70-130	15		30
1,2,4,5-Tetramethylbenzene	98		124		70-130	23		30
Ethyl ether	88		86		67-130	2		30
trans-1,4-Dichloro-2-butene	88		93		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	88		91		70-130
Toluene-d8	93		96		70-130
4-Bromofluorobenzene	97		95		70-130
Dibromofluoromethane	90		90		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06 Batch: WG1762962-3 WG1762962-4								
Methylene chloride	96		88		70-130	9		30
1,1-Dichloroethane	104		93		70-130	11		30
Chloroform	104		94		70-130	10		30
Carbon tetrachloride	103		89		70-130	15		30
1,2-Dichloropropane	103		94		70-130	9		30
Dibromochloromethane	97		91		70-130	6		30
1,1,2-Trichloroethane	91		87		70-130	4		30
Tetrachloroethene	106		89		70-130	17		30
Chlorobenzene	98		88		70-130	11		30
Trichlorofluoromethane	117		100		70-139	16		30
1,2-Dichloroethane	103		98		70-130	5		30
1,1,1-Trichloroethane	111		97		70-130	13		30
Bromodichloromethane	106		98		70-130	8		30
trans-1,3-Dichloropropene	93		87		70-130	7		30
cis-1,3-Dichloropropene	107		100		70-130	7		30
1,1-Dichloropropene	108		94		70-130	14		30
Bromoform	88		86		70-130	2		30
1,1,2,2-Tetrachloroethane	83		81		70-130	2		30
Benzene	106		95		70-130	11		30
Toluene	92		81		70-130	13		30
Ethylbenzene	95		84		70-130	12		30
Chloromethane	116		99		52-130	16		30
Bromomethane	107		94		57-147	13		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06 Batch: WG1762962-3 WG1762962-4								
Vinyl chloride	114		96		67-130	17		30
Chloroethane	108		93		50-151	15		30
1,1-Dichloroethene	108		94		65-135	14		30
trans-1,2-Dichloroethene	109		95		70-130	14		30
Trichloroethene	108		94		70-130	14		30
1,2-Dichlorobenzene	95		89		70-130	7		30
1,3-Dichlorobenzene	95		87		70-130	9		30
1,4-Dichlorobenzene	94		86		70-130	9		30
Methyl tert butyl ether	108		104		66-130	4		30
p/m-Xylene	98		87		70-130	12		30
o-Xylene	100		89		70-130	12		30
cis-1,2-Dichloroethene	106		98		70-130	8		30
Dibromomethane	105		101		70-130	4		30
Styrene	98		89		70-130	10		30
Dichlorodifluoromethane	115		97		30-146	17		30
Acetone	106		109		54-140	3		30
Carbon disulfide	116		100		59-130	15		30
2-Butanone	79		86		70-130	8		30
Vinyl acetate	95		92		70-130	3		30
4-Methyl-2-pentanone	77		79		70-130	3		30
1,2,3-Trichloropropane	83		81		68-130	2		30
2-Hexanone	78		77		70-130	1		30
Bromochloromethane	111		108		70-130	3		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06 Batch: WG1762962-3 WG1762962-4								
2,2-Dichloropropane	104		90		70-130	14		30
1,2-Dibromoethane	96		92		70-130	4		30
1,3-Dichloropropane	92		87		69-130	6		30
1,1,1,2-Tetrachloroethane	101		92		70-130	9		30
Bromobenzene	95		87		70-130	9		30
n-Butylbenzene	92		81		70-130	13		30
sec-Butylbenzene	92		80		70-130	14		30
tert-Butylbenzene	92		81		70-130	13		30
o-Chlorotoluene	91		80		70-130	13		30
p-Chlorotoluene	90		80		70-130	12		30
1,2-Dibromo-3-chloropropane	77		79		68-130	3		30
Hexachlorobutadiene	95		87		67-130	9		30
Isopropylbenzene	92		79		70-130	15		30
p-Isopropyltoluene	95		83		70-130	13		30
Naphthalene	84		86		70-130	2		30
Acrylonitrile	79		82		70-130	4		30
n-Propylbenzene	92		80		70-130	14		30
1,2,3-Trichlorobenzene	94		94		70-130	0		30
1,2,4-Trichlorobenzene	99		95		70-130	4		30
1,3,5-Trimethylbenzene	94		82		70-130	14		30
1,2,4-Trimethylbenzene	92		83		70-130	10		30
1,4-Dioxane	76		85		65-136	11		30
p-Diethylbenzene	95		84		70-130	12		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06 Batch: WG1762962-3 WG1762962-4								
p-Ethyltoluene	94		83		70-130	12		30
1,2,4,5-Tetramethylbenzene	96		89		70-130	8		30
Ethyl ether	107		102		67-130	5		30
trans-1,4-Dichloro-2-butene	76		74		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		105		70-130
Toluene-d8	94		93		70-130
4-Bromofluorobenzene	93		92		70-130
Dibromofluoromethane	107		109		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02,06 Batch: WG1762965-3 WG1762965-4								
Methylene chloride	96		88		70-130	9		30
1,1-Dichloroethane	104		93		70-130	11		30
Chloroform	104		94		70-130	10		30
Carbon tetrachloride	103		89		70-130	15		30
1,2-Dichloropropane	103		94		70-130	9		30
Dibromochloromethane	97		91		70-130	6		30
1,1,2-Trichloroethane	91		87		70-130	4		30
Tetrachloroethene	106		89		70-130	17		30
Chlorobenzene	98		88		70-130	11		30
Trichlorofluoromethane	117		100		70-139	16		30
1,2-Dichloroethane	103		98		70-130	5		30
1,1,1-Trichloroethane	111		97		70-130	13		30
Bromodichloromethane	106		98		70-130	8		30
trans-1,3-Dichloropropene	93		87		70-130	7		30
cis-1,3-Dichloropropene	107		100		70-130	7		30
1,1-Dichloropropene	108		94		70-130	14		30
Bromoform	88		86		70-130	2		30
1,1,2,2-Tetrachloroethane	83		81		70-130	2		30
Benzene	106		95		70-130	11		30
Toluene	92		81		70-130	13		30
Ethylbenzene	95		84		70-130	12		30
Chloromethane	116		99		52-130	16		30
Bromomethane	107		94		57-147	13		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02,06 Batch: WG1762965-3 WG1762965-4								
Vinyl chloride	114		96		67-130	17		30
Chloroethane	108		93		50-151	15		30
1,1-Dichloroethene	108		94		65-135	14		30
trans-1,2-Dichloroethene	109		95		70-130	14		30
Trichloroethene	108		94		70-130	14		30
1,2-Dichlorobenzene	95		89		70-130	7		30
1,3-Dichlorobenzene	95		87		70-130	9		30
1,4-Dichlorobenzene	94		86		70-130	9		30
Methyl tert butyl ether	108		104		66-130	4		30
p/m-Xylene	98		87		70-130	12		30
o-Xylene	100		89		70-130	12		30
cis-1,2-Dichloroethene	106		98		70-130	8		30
Dibromomethane	105		101		70-130	4		30
Styrene	98		89		70-130	10		30
Dichlorodifluoromethane	115		97		30-146	17		30
Acetone	106		109		54-140	3		30
Carbon disulfide	116		100		59-130	15		30
2-Butanone	79		86		70-130	8		30
Vinyl acetate	95		92		70-130	3		30
4-Methyl-2-pentanone	77		79		70-130	3		30
1,2,3-Trichloropropane	83		81		68-130	2		30
2-Hexanone	78		77		70-130	1		30
Bromochloromethane	111		108		70-130	3		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02,06 Batch: WG1762965-3 WG1762965-4								
2,2-Dichloropropane	104		90		70-130	14		30
1,2-Dibromoethane	96		92		70-130	4		30
1,3-Dichloropropane	92		87		69-130	6		30
1,1,1,2-Tetrachloroethane	101		92		70-130	9		30
Bromobenzene	95		87		70-130	9		30
n-Butylbenzene	92		81		70-130	13		30
sec-Butylbenzene	92		80		70-130	14		30
tert-Butylbenzene	92		81		70-130	13		30
o-Chlorotoluene	91		80		70-130	13		30
p-Chlorotoluene	90		80		70-130	12		30
1,2-Dibromo-3-chloropropane	77		79		68-130	3		30
Hexachlorobutadiene	95		87		67-130	9		30
Isopropylbenzene	92		79		70-130	15		30
p-Isopropyltoluene	95		83		70-130	13		30
Naphthalene	84		86		70-130	2		30
Acrylonitrile	79		82		70-130	4		30
n-Propylbenzene	92		80		70-130	14		30
1,2,3-Trichlorobenzene	94		94		70-130	0		30
1,2,4-Trichlorobenzene	99		95		70-130	4		30
1,3,5-Trimethylbenzene	94		82		70-130	14		30
1,2,4-Trimethylbenzene	92		83		70-130	10		30
1,4-Dioxane	76		85		65-136	11		30
p-Diethylbenzene	95		84		70-130	12		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02,06 Batch: WG1762965-3 WG1762965-4								
p-Ethyltoluene	94		83		70-130	12		30
1,2,4,5-Tetramethylbenzene	96		89		70-130	8		30
Ethyl ether	107		102		67-130	5		30
trans-1,4-Dichloro-2-butene	76		74		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		105		70-130
Toluene-d8	94		93		70-130
4-Bromofluorobenzene	93		92		70-130
Dibromofluoromethane	107		109		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02 Batch: WG1763068-3 WG1763068-4								
Methylene chloride	95		94		70-130	1		30
1,1-Dichloroethane	103		101		70-130	2		30
Chloroform	107		106		70-130	1		30
Carbon tetrachloride	103		101		70-130	2		30
1,2-Dichloropropane	102		102		70-130	0		30
Dibromochloromethane	96		94		70-130	2		30
1,1,2-Trichloroethane	91		90		70-130	1		30
Tetrachloroethene	102		97		70-130	5		30
Chlorobenzene	97		94		70-130	3		30
Trichlorofluoromethane	115		110		70-139	4		30
1,2-Dichloroethane	103		104		70-130	1		30
1,1,1-Trichloroethane	110		108		70-130	2		30
Bromodichloromethane	105		106		70-130	1		30
trans-1,3-Dichloropropene	92		90		70-130	2		30
cis-1,3-Dichloropropene	106		108		70-130	2		30
1,1-Dichloropropene	106		104		70-130	2		30
Bromoform	88		86		70-130	2		30
1,1,2,2-Tetrachloroethane	84		82		70-130	2		30
Benzene	106		104		70-130	2		30
Toluene	91		87		70-130	4		30
Ethylbenzene	92		88		70-130	4		30
Chloromethane	113		109		52-130	4		30
Bromomethane	107		102		57-147	5		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02 Batch: WG1763068-3 WG1763068-4								
Vinyl chloride	112		106		67-130	6		30
Chloroethane	108		104		50-151	4		30
1,1-Dichloroethene	110		105		65-135	5		30
trans-1,2-Dichloroethene	110		108		70-130	2		30
Trichloroethene	107		104		70-130	3		30
1,2-Dichlorobenzene	95		89		70-130	7		30
1,3-Dichlorobenzene	95		89		70-130	7		30
1,4-Dichlorobenzene	95		90		70-130	5		30
Methyl tert butyl ether	108		110		66-130	2		30
p/m-Xylene	97		93		70-130	4		30
o-Xylene	98		94		70-130	4		30
cis-1,2-Dichloroethene	105		105		70-130	0		30
Dibromomethane	104		106		70-130	2		30
Styrene	96		94		70-130	2		30
Dichlorodifluoromethane	115		108		30-146	6		30
Acetone	96		104		54-140	8		30
Carbon disulfide	116		111		59-130	4		30
2-Butanone	78		81		70-130	4		30
Vinyl acetate	92		98		70-130	6		30
4-Methyl-2-pentanone	77		79		70-130	3		30
1,2,3-Trichloropropane	83		80		68-130	4		30
2-Hexanone	72		74		70-130	3		30
Bromochloromethane	114		116		70-130	2		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02 Batch: WG1763068-3 WG1763068-4								
2,2-Dichloropropane	103		101		70-130	2		30
1,2-Dibromoethane	95		94		70-130	1		30
1,3-Dichloropropane	91		90		69-130	1		30
1,1,1,2-Tetrachloroethane	101		98		70-130	3		30
Bromobenzene	94		90		70-130	4		30
n-Butylbenzene	90		85		70-130	6		30
sec-Butylbenzene	92		85		70-130	8		30
tert-Butylbenzene	92		85		70-130	8		30
o-Chlorotoluene	109		92		70-130	17		30
p-Chlorotoluene	90		83		70-130	8		30
1,2-Dibromo-3-chloropropane	76		79		68-130	4		30
Hexachlorobutadiene	94		91		67-130	3		30
Isopropylbenzene	92		83		70-130	10		30
p-Isopropyltoluene	94		88		70-130	7		30
Naphthalene	83		85		70-130	2		30
Acrylonitrile	78		82		70-130	5		30
n-Propylbenzene	91		84		70-130	8		30
1,2,3-Trichlorobenzene	94		95		70-130	1		30
1,2,4-Trichlorobenzene	97		96		70-130	1		30
1,3,5-Trimethylbenzene	93		86		70-130	8		30
1,2,4-Trimethylbenzene	93		87		70-130	7		30
1,4-Dioxane	77		82		65-136	6		30
p-Diethylbenzene	94		88		70-130	7		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02 Batch: WG1763068-3 WG1763068-4								
p-Ethyltoluene	94		87		70-130	8		30
1,2,4,5-Tetramethylbenzene	94		92		70-130	2		30
Ethyl ether	104		109		67-130	5		30
trans-1,4-Dichloro-2-butene	82		74		70-130	10		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	100		104		70-130
Toluene-d8	94		91		70-130
4-Bromofluorobenzene	94		90		70-130
Dibromofluoromethane	108		109		70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 QC Batch ID: WG1762473-6 WG1762473-7 QC Sample: L2316548-07 Client ID: SB06_0-2												
Methylene chloride	ND	117	90	76		82	76		70-130	9		30
1,1-Dichloroethane	ND	117	93	80		86	80		70-130	8		30
Chloroform	ND	117	96	82		88	82		70-130	9		30
Carbon tetrachloride	ND	117	120	105		120	107		70-130	6		30
1,2-Dichloropropane	ND	117	98	84		89	83		70-130	10		30
Dibromochloromethane	ND	117	120	100		100	96		70-130	12		30
1,1,2-Trichloroethane	ND	117	93	79		83	77		70-130	11		30
Tetrachloroethene	ND	117	100	89		92	85		70-130	12		30
Chlorobenzene	ND	117	110	91		92	85		70-130	14		30
Trichlorofluoromethane	ND	117	110	96		110	102		70-139	2		30
1,2-Dichloroethane	ND	117	95	81		87	80		70-130	10		30
1,1,1-Trichloroethane	ND	117	120	102		110	104		70-130	7		30
Bromodichloromethane	ND	117	100	86		91	85		70-130	10		30
trans-1,3-Dichloropropene	ND	117	95	81		84	78		70-130	12		30
cis-1,3-Dichloropropene	ND	117	110	91		95	88		70-130	12		30
1,1-Dichloropropene	ND	117	110	94		100	94		70-130	9		30
Bromoform	ND	117	100	88		94	87		70-130	10		30
1,1,2,2-Tetrachloroethane	ND	117	97	83		87	81		70-130	11		30
Benzene	ND	117	110	91		96	88		70-130	10		30
Toluene	ND	117	110	92		98	90		70-130	10		30
Ethylbenzene	ND	117	100	89		90	84		70-130	14		30
Chloromethane	ND	117	77	66		71	66		52-130	7		30
Bromomethane	ND	117	100	87		94	87		57-147	8		30

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 QC Batch ID: WG1762473-6 WG1762473-7 QC Sample: L2316548-07 Client ID: SB06_0-2												
Vinyl chloride	ND	117	85	73		79	73		67-130	7		30
Chloroethane	ND	117	100	88		96	89		50-151	7		30
1,1-Dichloroethene	ND	117	100	89		96	89		65-135	8		30
trans-1,2-Dichloroethene	ND	117	100	86		93	87		70-130	8		30
Trichloroethene	ND	117	120	100		110	100		70-130	8		30
1,2-Dichlorobenzene	ND	117	99	84		83	77		70-130	17		30
1,3-Dichlorobenzene	ND	117	97	83		80	74		70-130	19		30
1,4-Dichlorobenzene	ND	117	93	80		77	72		70-130	18		30
Methyl tert butyl ether	ND	117	110	91		96	89		66-130	11		30
p/m-Xylene	ND	234	200	85		170	80		70-130	14		30
o-Xylene	ND	234	200	87		180	82		70-130	14		30
cis-1,2-Dichloroethene	ND	117	97	83		89	82		70-130	9		30
Dibromomethane	ND	117	94	80		85	79		70-130	10		30
Styrene	ND	234	200	87		170	81		70-130	16		30
Dichlorodifluoromethane	ND	117	97	83		90	83		30-146	8		30
Acetone	ND	117	87	74		78	72		54-140	11		30
Carbon disulfide	ND	117	150	128		140	127		59-130	9		30
2-Butanone	ND	117	92	78		82	76		70-130	11		30
Vinyl acetate	ND	117	94	80		73	68	Q	70-130	25		30
4-Methyl-2-pentanone	ND	117	94	81		83	76		70-130	13		30
1,2,3-Trichloropropane	ND	117	97	83		86	80		68-130	12		30
2-Hexanone	ND	117	89	76		78	73		70-130	12		30
Bromochloromethane	ND	117	98	84		88	82		70-130	10		30

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 QC Batch ID: WG1762473-6 WG1762473-7 QC Sample: L2316548-07 Client ID: SB06_0-2												
2,2-Dichloropropane	ND	117	110	97		100	96		70-130	8		30
1,2-Dibromoethane	ND	117	98	84		87	81		70-130	11		30
1,3-Dichloropropane	ND	117	100	85		89	82		69-130	12		30
1,1,1,2-Tetrachloroethane	ND	117	120	106		110	102		70-130	12		30
Bromobenzene	ND	117	110	91		93	86		70-130	14		30
n-Butylbenzene	ND	117	95	81		74	69	Q	70-130	25		30
sec-Butylbenzene	ND	117	110	90		86	80		70-130	20		30
tert-Butylbenzene	ND	117	110	95		94	87		70-130	17		30
o-Chlorotoluene	ND	117	110	92		90	83		70-130	18		30
p-Chlorotoluene	ND	117	100	86		84	78		70-130	17		30
1,2-Dibromo-3-chloropropane	ND	117	100	88		93	87		68-130	10		30
Hexachlorobutadiene	ND	117	86	73		63	58	Q	67-130	31	Q	30
Isopropylbenzene	ND	117	110	95		96	89		70-130	14		30
p-Isopropyltoluene	ND	117	110	91		85	79		70-130	22		30
Naphthalene	ND	117	76	65	Q	69	64	Q	70-130	10		30
Acrylonitrile	ND	117	90	77		82	76		70-130	9		30
n-Propylbenzene	ND	117	100	89		87	81		70-130	18		30
1,2,3-Trichlorobenzene	ND	117	80	68	Q	65	60	Q	70-130	20		30
1,2,4-Trichlorobenzene	ND	117	80	68	Q	65	60	Q	70-130	21		30
1,3,5-Trimethylbenzene	ND	117	100	87		84	78		70-130	19		30
1,2,4-Trimethylbenzene	ND	117	98	84		80	74		70-130	20		30
1,4-Dioxane	ND	5850	3700	64	Q	3900	72		65-136	4		30
p-Diethylbenzene	ND	117	98	84		77	71		70-130	24		30

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,05,07 QC Batch ID: WG1762473-6 WG1762473-7 QC Sample: L2316548-07 Client ID: SB06_0-2												
p-Ethyltoluene	ND	117	100	86		84	77		70-130	19		30
1,2,4,5-Tetramethylbenzene	ND	117	75	64	Q	61	56	Q	70-130	21		30
Ethyl ether	ND	117	90	77		83	77		67-130	8		30
trans-1,4-Dichloro-2-butene	ND	117	110	91		95	88		70-130	11		30

Surrogate	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		92		70-130
4-Bromofluorobenzene	97		99		70-130
Dibromofluoromethane	88		88		70-130
Toluene-d8	99		99		70-130

SEMIVOLATILES

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316548**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-01
 Client ID: SB04_2-4
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 09:40
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/05/23 07:02
 Analyst: LJG
 Percent Solids: 80%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 22:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	310		ug/kg	160	21.	1
1,2,4-Trichlorobenzene	ND		ug/kg	200	23.	1
Hexachlorobenzene	ND		ug/kg	120	23.	1
Bis(2-chloroethyl)ether	ND		ug/kg	180	28.	1
2-Chloronaphthalene	ND		ug/kg	200	20.	1
1,2-Dichlorobenzene	ND		ug/kg	200	37.	1
1,3-Dichlorobenzene	ND		ug/kg	200	35.	1
1,4-Dichlorobenzene	ND		ug/kg	200	36.	1
3,3'-Dichlorobenzidine	ND		ug/kg	200	54.	1
2,4-Dinitrotoluene	ND		ug/kg	200	41.	1
2,6-Dinitrotoluene	ND		ug/kg	200	35.	1
Fluoranthene	5200		ug/kg	120	23.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	200	22.	1
4-Bromophenyl phenyl ether	ND		ug/kg	200	31.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	240	35.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	220	20.	1
Hexachlorobutadiene	ND		ug/kg	200	30.	1
Hexachlorocyclopentadiene	ND		ug/kg	580	180	1
Hexachloroethane	ND		ug/kg	160	33.	1
Isophorone	ND		ug/kg	180	26.	1
Naphthalene	680		ug/kg	200	25.	1
Nitrobenzene	ND		ug/kg	180	30.	1
NDPA/DPA	65	J	ug/kg	160	23.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	200	31.	1
Bis(2-ethylhexyl)phthalate	480		ug/kg	200	70.	1
Butyl benzyl phthalate	380		ug/kg	200	51.	1
Di-n-butylphthalate	ND		ug/kg	200	39.	1
Di-n-octylphthalate	ND		ug/kg	200	69.	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01

Date Collected: 03/29/23 09:40

Client ID: SB04_2-4

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	200	19.	1
Dimethyl phthalate	ND		ug/kg	200	43.	1
Benzo(a)anthracene	2700		ug/kg	120	23.	1
Benzo(a)pyrene	2900		ug/kg	160	50.	1
Benzo(b)fluoranthene	3000		ug/kg	120	34.	1
Benzo(k)fluoranthene	1100		ug/kg	120	33.	1
Chrysene	2800		ug/kg	120	21.	1
Acenaphthylene	460		ug/kg	160	31.	1
Anthracene	1200		ug/kg	120	40.	1
Benzo(ghi)perylene	1300		ug/kg	160	24.	1
Fluorene	410		ug/kg	200	20.	1
Phenanthrene	2700		ug/kg	120	25.	1
Dibenzo(a,h)anthracene	360		ug/kg	120	24.	1
Indeno(1,2,3-cd)pyrene	1500		ug/kg	160	28.	1
Pyrene	5500		ug/kg	120	20.	1
Biphenyl	66	J	ug/kg	460	26.	1
4-Chloroaniline	ND		ug/kg	200	37.	1
2-Nitroaniline	ND		ug/kg	200	39.	1
3-Nitroaniline	ND		ug/kg	200	38.	1
4-Nitroaniline	ND		ug/kg	200	84.	1
Dibenzofuran	90	J	ug/kg	200	19.	1
2-Methylnaphthalene	330		ug/kg	240	25.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	200	21.	1
Acetophenone	38	J	ug/kg	200	25.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	39.	1
p-Chloro-m-cresol	ND		ug/kg	200	30.	1
2-Chlorophenol	ND		ug/kg	200	24.	1
2,4-Dichlorophenol	ND		ug/kg	180	33.	1
2,4-Dimethylphenol	ND		ug/kg	200	67.	1
2-Nitrophenol	ND		ug/kg	440	77.	1
4-Nitrophenol	ND		ug/kg	280	83.	1
2,4-Dinitrophenol	ND		ug/kg	980	95.	1
4,6-Dinitro-o-cresol	ND		ug/kg	530	98.	1
Pentachlorophenol	ND		ug/kg	160	45.	1
Phenol	140	J	ug/kg	200	31.	1
2-Methylphenol	ND		ug/kg	200	32.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	290	32.	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01
Client ID: SB04_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 09:40
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	200	39.	1
Benzoic Acid	ND		ug/kg	660	210	1
Benzyl Alcohol	ND		ug/kg	200	62.	1
Carbazole	130	J	ug/kg	200	20.	1
1,4-Dioxane	ND		ug/kg	30	9.4	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	49		25-120
Phenol-d6	70		10-120
Nitrobenzene-d5	66		23-120
2-Fluorobiphenyl	56		30-120
2,4,6-Tribromophenol	10		10-136
4-Terphenyl-d14	46		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-02 D

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Extraction Method: EPA 3546

Analytical Method: 1,8270E

Extraction Date: 04/01/23 02:29

Analytical Date: 04/04/23 07:00

Analyst: SZ

Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	18000		ug/kg	8100	1000	50
1,2,4-Trichlorobenzene	ND		ug/kg	10000	1200	50
Hexachlorobenzene	ND		ug/kg	6000	1100	50
Bis(2-chloroethyl)ether	ND		ug/kg	9100	1400	50
2-Chloronaphthalene	ND		ug/kg	10000	1000	50
1,2-Dichlorobenzene	ND		ug/kg	10000	1800	50
1,3-Dichlorobenzene	ND		ug/kg	10000	1700	50
1,4-Dichlorobenzene	ND		ug/kg	10000	1800	50
3,3'-Dichlorobenzidine	ND		ug/kg	10000	2700	50
2,4-Dinitrotoluene	ND		ug/kg	10000	2000	50
2,6-Dinitrotoluene	ND		ug/kg	10000	1700	50
Fluoranthene	26000		ug/kg	6000	1200	50
4-Chlorophenyl phenyl ether	ND		ug/kg	10000	1100	50
4-Bromophenyl phenyl ether	ND		ug/kg	10000	1500	50
Bis(2-chloroisopropyl)ether	ND		ug/kg	12000	1700	50
Bis(2-chloroethoxy)methane	ND		ug/kg	11000	1000	50
Hexachlorobutadiene	ND		ug/kg	10000	1500	50
Hexachlorocyclopentadiene	ND		ug/kg	29000	9100	50
Hexachloroethane	ND		ug/kg	8100	1600	50
Isophorone	ND		ug/kg	9100	1300	50
Naphthalene	230000		ug/kg	10000	1200	50
Nitrobenzene	ND		ug/kg	9100	1500	50
NDPA/DPA	ND		ug/kg	8100	1100	50
n-Nitrosodi-n-propylamine	ND		ug/kg	10000	1600	50
Bis(2-ethylhexyl)phthalate	ND		ug/kg	10000	3500	50
Butyl benzyl phthalate	ND		ug/kg	10000	2500	50
Di-n-butylphthalate	ND		ug/kg	10000	1900	50
Di-n-octylphthalate	ND		ug/kg	10000	3400	50

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-02 D

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	10000	930	50
Dimethyl phthalate	ND		ug/kg	10000	2100	50
Benzo(a)anthracene	12000		ug/kg	6000	1100	50
Benzo(a)pyrene	12000		ug/kg	8100	2500	50
Benzo(b)fluoranthene	8900		ug/kg	6000	1700	50
Benzo(k)fluoranthene	2000	J	ug/kg	6000	1600	50
Chrysene	12000		ug/kg	6000	1000	50
Acenaphthylene	9200		ug/kg	8100	1600	50
Anthracene	13000		ug/kg	6000	2000	50
Benzo(ghi)perylene	3600	J	ug/kg	8100	1200	50
Fluorene	31000		ug/kg	10000	980	50
Phenanthrene	90000		ug/kg	6000	1200	50
Dibenzo(a,h)anthracene	1200	J	ug/kg	6000	1200	50
Indeno(1,2,3-cd)pyrene	3400	J	ug/kg	8100	1400	50
Pyrene	39000		ug/kg	6000	1000	50
Biphenyl	12000	J	ug/kg	23000	1300	50
4-Chloroaniline	ND		ug/kg	10000	1800	50
2-Nitroaniline	ND		ug/kg	10000	1900	50
3-Nitroaniline	ND		ug/kg	10000	1900	50
4-Nitroaniline	ND		ug/kg	10000	4200	50
Dibenzofuran	3200	J	ug/kg	10000	950	50
2-Methylnaphthalene	130000		ug/kg	12000	1200	50
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	10000	1000	50
Acetophenone	ND		ug/kg	10000	1200	50
2,4,6-Trichlorophenol	ND		ug/kg	6000	1900	50
p-Chloro-m-cresol	ND		ug/kg	10000	1500	50
2-Chlorophenol	ND		ug/kg	10000	1200	50
2,4-Dichlorophenol	ND		ug/kg	9100	1600	50
2,4-Dimethylphenol	ND		ug/kg	10000	3300	50
2-Nitrophenol	ND		ug/kg	22000	3800	50
4-Nitrophenol	ND		ug/kg	14000	4100	50
2,4-Dinitrophenol	ND		ug/kg	48000	4700	50
4,6-Dinitro-o-cresol	ND		ug/kg	26000	4800	50
Pentachlorophenol	ND		ug/kg	8100	2200	50
Phenol	ND		ug/kg	10000	1500	50
2-Methylphenol	ND		ug/kg	10000	1600	50
3-Methylphenol/4-Methylphenol	ND		ug/kg	14000	1600	50

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-02 D

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	10000	1900	50
Benzoic Acid	ND		ug/kg	33000	10000	50
Benzyl Alcohol	ND		ug/kg	10000	3100	50
Carbazole	ND		ug/kg	10000	980	50
1,4-Dioxane	ND		ug/kg	1500	460	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	0	Q	25-120
Phenol-d6	0	Q	10-120
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
2,4,6-Tribromophenol	0	Q	10-136
4-Terphenyl-d14	0	Q	18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-05
 Client ID: SB07_0-2
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 15:55
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/03/23 03:26
 Analyst: MG
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 04/02/23 00:58

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	140	19.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	21.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	24.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
1,2-Dichlorobenzene	ND		ug/kg	180	32.	1
1,3-Dichlorobenzene	ND		ug/kg	180	31.	1
1,4-Dichlorobenzene	ND		ug/kg	180	32.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	36.	1
2,6-Dinitrotoluene	ND		ug/kg	180	31.	1
Fluoranthene	220		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	31.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	160	1
Hexachloroethane	ND		ug/kg	140	29.	1
Isophorone	ND		ug/kg	160	23.	1
Naphthalene	25	J	ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	27.	1
NDPA/DPA	ND		ug/kg	140	20.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	28.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	62.	1
Butyl benzyl phthalate	ND		ug/kg	180	46.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	61.	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-05
 Client ID: SB07_0-2
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 15:55
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	17.	1
Dimethyl phthalate	ND		ug/kg	180	38.	1
Benzo(a)anthracene	160		ug/kg	110	20.	1
Benzo(a)pyrene	220		ug/kg	140	44.	1
Benzo(b)fluoranthene	240		ug/kg	110	30.	1
Benzo(k)fluoranthene	74	J	ug/kg	110	29.	1
Chrysene	180		ug/kg	110	19.	1
Acenaphthylene	200		ug/kg	140	28.	1
Anthracene	84	J	ug/kg	110	35.	1
Benzo(ghi)perylene	160		ug/kg	140	21.	1
Fluorene	36	J	ug/kg	180	18.	1
Phenanthrene	130		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	36	J	ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	120	J	ug/kg	140	25.	1
Pyrene	320		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	410	23.	1
4-Chloroaniline	ND		ug/kg	180	33.	1
2-Nitroaniline	ND		ug/kg	180	35.	1
3-Nitroaniline	ND		ug/kg	180	34.	1
4-Nitroaniline	ND		ug/kg	180	75.	1
Dibenzofuran	ND		ug/kg	180	17.	1
2-Methylnaphthalene	ND		ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	27.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	29.	1
2,4-Dimethylphenol	ND		ug/kg	180	60.	1
2-Nitrophenol	ND		ug/kg	390	68.	1
4-Nitrophenol	ND		ug/kg	250	74.	1
2,4-Dinitrophenol	ND		ug/kg	870	84.	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	87.	1
Pentachlorophenol	ND		ug/kg	140	40.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	28.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	28.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS****Lab ID:** L2316548-05**Date Collected:** 03/29/23 15:55**Client ID:** SB07_0-2**Date Received:** 03/29/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	35.	1
Benzoic Acid	ND		ug/kg	580	180	1
Benzyl Alcohol	ND		ug/kg	180	55.	1
Carbazole	ND		ug/kg	180	18.	1
1,4-Dioxane	ND		ug/kg	27	8.3	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	44		25-120
Phenol-d6	42		10-120
Nitrobenzene-d5	40		23-120
2-Fluorobiphenyl	48		30-120
2,4,6-Tribromophenol	55		10-136
4-Terphenyl-d14	53		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-06
 Client ID: SB07_5-6.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/03/23 01:27
 Analyst: MG
 Percent Solids: 80%

Extraction Method: EPA 3546
 Extraction Date: 04/01/23 02:29

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	400		ug/kg	170	22.	1
1,2,4-Trichlorobenzene	ND		ug/kg	210	24.	1
Hexachlorobenzene	ND		ug/kg	120	23.	1
Bis(2-chloroethyl)ether	ND		ug/kg	190	28.	1
2-Chloronaphthalene	ND		ug/kg	210	21.	1
1,2-Dichlorobenzene	ND		ug/kg	210	37.	1
1,3-Dichlorobenzene	ND		ug/kg	210	36.	1
1,4-Dichlorobenzene	ND		ug/kg	210	36.	1
3,3'-Dichlorobenzidine	ND		ug/kg	210	55.	1
2,4-Dinitrotoluene	ND		ug/kg	210	42.	1
2,6-Dinitrotoluene	ND		ug/kg	210	36.	1
Fluoranthene	1600		ug/kg	120	24.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	210	22.	1
4-Bromophenyl phenyl ether	ND		ug/kg	210	32.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	250	36.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	220	21.	1
Hexachlorobutadiene	ND		ug/kg	210	30.	1
Hexachlorocyclopentadiene	ND		ug/kg	600	190	1
Hexachloroethane	ND		ug/kg	170	34.	1
Isophorone	ND		ug/kg	190	27.	1
Naphthalene	460		ug/kg	210	25.	1
Nitrobenzene	ND		ug/kg	190	31.	1
NDPA/DPA	ND		ug/kg	170	24.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	210	32.	1
Bis(2-ethylhexyl)phthalate	300		ug/kg	210	72.	1
Butyl benzyl phthalate	ND		ug/kg	210	52.	1
Di-n-butylphthalate	ND		ug/kg	210	39.	1
Di-n-octylphthalate	ND		ug/kg	210	71.	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-06
 Client ID: SB07_5-6.5
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	210	19.	1
Dimethyl phthalate	ND		ug/kg	210	44.	1
Benzo(a)anthracene	1100		ug/kg	120	23.	1
Benzo(a)pyrene	1100		ug/kg	170	51.	1
Benzo(b)fluoranthene	1100		ug/kg	120	35.	1
Benzo(k)fluoranthene	290		ug/kg	120	33.	1
Chrysene	1100		ug/kg	120	22.	1
Acenaphthylene	1100		ug/kg	170	32.	1
Anthracene	670		ug/kg	120	40.	1
Benzo(ghi)perylene	680		ug/kg	170	24.	1
Fluorene	400		ug/kg	210	20.	1
Phenanthrene	1800		ug/kg	120	25.	1
Dibenzo(a,h)anthracene	170		ug/kg	120	24.	1
Indeno(1,2,3-cd)pyrene	500		ug/kg	170	29.	1
Pyrene	2400		ug/kg	120	21.	1
Biphenyl	64	J	ug/kg	470	27.	1
4-Chloroaniline	ND		ug/kg	210	38.	1
2-Nitroaniline	ND		ug/kg	210	40.	1
3-Nitroaniline	ND		ug/kg	210	39.	1
4-Nitroaniline	ND		ug/kg	210	86.	1
Dibenzofuran	ND		ug/kg	210	20.	1
2-Methylnaphthalene	360		ug/kg	250	25.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	210	22.	1
Acetophenone	ND		ug/kg	210	26.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	39.	1
p-Chloro-m-cresol	ND		ug/kg	210	31.	1
2-Chlorophenol	ND		ug/kg	210	25.	1
2,4-Dichlorophenol	ND		ug/kg	190	33.	1
2,4-Dimethylphenol	ND		ug/kg	210	69.	1
2-Nitrophenol	ND		ug/kg	450	78.	1
4-Nitrophenol	ND		ug/kg	290	85.	1
2,4-Dinitrophenol	ND		ug/kg	1000	97.	1
4,6-Dinitro-o-cresol	ND		ug/kg	540	100	1
Pentachlorophenol	ND		ug/kg	170	46.	1
Phenol	ND		ug/kg	210	31.	1
2-Methylphenol	ND		ug/kg	210	32.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	300	33.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS****Lab ID:** L2316548-06**Date Collected:** 03/29/23 16:05**Client ID:** SB07_5-6.5**Date Received:** 03/29/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	210	40.	1
Benzoic Acid	ND		ug/kg	670	210	1
Benzyl Alcohol	ND		ug/kg	210	64.	1
Carbazole	64	J	ug/kg	210	20.	1
1,4-Dioxane	ND		ug/kg	31	9.6	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	61		25-120
Phenol-d6	59		10-120
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	62		30-120
2,4,6-Tribromophenol	72		10-136
4-Terphenyl-d14	65		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-07
 Client ID: SB06_0-2
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/03/23 01:44
 Analyst: MG
 Percent Solids: 92%

Extraction Method: EPA 3546
 Extraction Date: 04/01/23 02:29

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	71	J	ug/kg	140	18.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	20.	1
Hexachlorobenzene	ND		ug/kg	100	20.	1
Bis(2-chloroethyl)ether	30	J	ug/kg	160	24.	1
2-Chloronaphthalene	ND		ug/kg	180	17.	1
1,2-Dichlorobenzene	ND		ug/kg	180	31.	1
1,3-Dichlorobenzene	ND		ug/kg	180	30.	1
1,4-Dichlorobenzene	ND		ug/kg	180	30.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	47.	1
2,4-Dinitrotoluene	ND		ug/kg	180	35.	1
2,6-Dinitrotoluene	ND		ug/kg	180	30.	1
Fluoranthene	23	J	ug/kg	100	20.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	27.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	210	30.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	190	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	500	160	1
Hexachloroethane	ND		ug/kg	140	28.	1
Isophorone	ND		ug/kg	160	23.	1
Naphthalene	ND		ug/kg	180	21.	1
Nitrobenzene	ND		ug/kg	160	26.	1
NDPA/DPA	ND		ug/kg	140	20.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	27.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	61.	1
Butyl benzyl phthalate	ND		ug/kg	180	44.	1
Di-n-butylphthalate	ND		ug/kg	180	33.	1
Di-n-octylphthalate	ND		ug/kg	180	60.	1

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07
 Client ID: SB06_0-2
 Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40
 Date Received: 03/29/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	16.	1
Dimethyl phthalate	ND		ug/kg	180	37.	1
Benzo(a)anthracene	ND		ug/kg	100	20.	1
Benzo(a)pyrene	ND		ug/kg	140	43.	1
Benzo(b)fluoranthene	ND		ug/kg	100	30.	1
Benzo(k)fluoranthene	ND		ug/kg	100	28.	1
Chrysene	ND		ug/kg	100	18.	1
Acenaphthylene	200		ug/kg	140	27.	1
Anthracene	ND		ug/kg	100	34.	1
Benzo(ghi)perylene	ND		ug/kg	140	21.	1
Fluorene	38	J	ug/kg	180	17.	1
Phenanthrene	ND		ug/kg	100	21.	1
Dibenzo(a,h)anthracene	ND		ug/kg	100	20.	1
Indeno(1,2,3-cd)pyrene	ND		ug/kg	140	24.	1
Pyrene	26	J	ug/kg	100	17.	1
Biphenyl	ND		ug/kg	400	23.	1
4-Chloroaniline	ND		ug/kg	180	32.	1
2-Nitroaniline	ND		ug/kg	180	34.	1
3-Nitroaniline	ND		ug/kg	180	33.	1
4-Nitroaniline	ND		ug/kg	180	72.	1
Dibenzofuran	ND		ug/kg	180	16.	1
2-Methylnaphthalene	ND		ug/kg	210	21.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	18.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	100	33.	1
p-Chloro-m-cresol	ND		ug/kg	180	26.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	28.	1
2,4-Dimethylphenol	ND		ug/kg	180	58.	1
2-Nitrophenol	ND		ug/kg	380	66.	1
4-Nitrophenol	ND		ug/kg	240	72.	1
2,4-Dinitrophenol	ND		ug/kg	840	82.	1
4,6-Dinitro-o-cresol	ND		ug/kg	460	84.	1
Pentachlorophenol	ND		ug/kg	140	38.	1
Phenol	ND		ug/kg	180	26.	1
2-Methylphenol	ND		ug/kg	180	27.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	250	27.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS****Lab ID:** L2316548-07**Date Collected:** 03/29/23 17:40**Client ID:** SB06_0-2**Date Received:** 03/29/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	34.	1
Benzoic Acid	ND		ug/kg	570	180	1
Benzyl Alcohol	ND		ug/kg	180	54.	1
Carbazole	ND		ug/kg	180	17.	1
1,4-Dioxane	ND		ug/kg	26	8.1	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	71		25-120
Phenol-d6	69		10-120
Nitrobenzene-d5	69		23-120
2-Fluorobiphenyl	77		30-120
2,4,6-Tribromophenol	93		10-136
4-Terphenyl-d14	78		18-120

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316548**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-08 D2

Client ID: SB06_12-14

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 18:00

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8270E

Analytical Date: 04/04/23 14:30

Analyst: IM

Percent Solids: 76%

Extraction Method: EPA 3546

Extraction Date: 04/01/23 02:29

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Fluoranthene	80000		ug/kg	26000	5000	200
Naphthalene	820000		ug/kg	44000	5300	200
Acenaphthylene	100000		ug/kg	35000	6700	200
Fluorene	97000		ug/kg	44000	4200	200
Phenanthrene	250000		ug/kg	26000	5300	200
Pyrene	130000		ug/kg	26000	4300	200
2-Methylnaphthalene	440000		ug/kg	52000	5300	200

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-08 D

Date Collected: 03/29/23 18:00

Client ID: SB06_12-14

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Extraction Method: EPA 3546

Analytical Method: 1,8270E

Extraction Date: 04/01/23 02:29

Analytical Date: 04/03/23 02:35

Analyst: MG

Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	47000		ug/kg	1700	220	10
1,2,4-Trichlorobenzene	ND		ug/kg	2200	250	10
Hexachlorobenzene	ND		ug/kg	1300	240	10
Bis(2-chloroethyl)ether	ND		ug/kg	2000	300	10
2-Chloronaphthalene	ND		ug/kg	2200	220	10
1,2-Dichlorobenzene	ND		ug/kg	2200	390	10
1,3-Dichlorobenzene	ND		ug/kg	2200	370	10
1,4-Dichlorobenzene	ND		ug/kg	2200	380	10
3,3'-Dichlorobenzidine	ND		ug/kg	2200	580	10
2,4-Dinitrotoluene	ND		ug/kg	2200	440	10
2,6-Dinitrotoluene	ND		ug/kg	2200	370	10
Fluoranthene	90000	E	ug/kg	1300	250	10
4-Chlorophenyl phenyl ether	ND		ug/kg	2200	230	10
4-Bromophenyl phenyl ether	ND		ug/kg	2200	330	10
Bis(2-chloroisopropyl)ether	ND		ug/kg	2600	370	10
Bis(2-chloroethoxy)methane	ND		ug/kg	2400	220	10
Hexachlorobutadiene	ND		ug/kg	2200	320	10
Hexachlorocyclopentadiene	ND		ug/kg	6200	2000	10
Hexachloroethane	ND		ug/kg	1700	350	10
Isophorone	ND		ug/kg	2000	280	10
Naphthalene	360000	E	ug/kg	2200	260	10
Nitrobenzene	ND		ug/kg	2000	320	10
NDPA/DPA	ND		ug/kg	1700	250	10
n-Nitrosodi-n-propylamine	ND		ug/kg	2200	340	10
Bis(2-ethylhexyl)phthalate	ND		ug/kg	2200	750	10
Butyl benzyl phthalate	ND		ug/kg	2200	550	10
Di-n-butylphthalate	ND		ug/kg	2200	410	10
Di-n-octylphthalate	ND		ug/kg	2200	740	10

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-08 D

Date Collected: 03/29/23 18:00

Client ID: SB06_12-14

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	2200	200	10
Dimethyl phthalate	ND		ug/kg	2200	460	10
Benzo(a)anthracene	60000		ug/kg	1300	240	10
Benzo(a)pyrene	55000		ug/kg	1700	530	10
Benzo(b)fluoranthene	34000		ug/kg	1300	370	10
Benzo(k)fluoranthene	18000		ug/kg	1300	350	10
Chrysene	57000		ug/kg	1300	230	10
Acenaphthylene	110000	E	ug/kg	1700	340	10
Anthracene	72000		ug/kg	1300	420	10
Benzo(ghi)perylene	28000		ug/kg	1700	260	10
Fluorene	99000	E	ug/kg	2200	210	10
Phenanthrene	220000	E	ug/kg	1300	260	10
Dibenzo(a,h)anthracene	7200		ug/kg	1300	250	10
Indeno(1,2,3-cd)pyrene	19000		ug/kg	1700	300	10
Pyrene	140000	E	ug/kg	1300	220	10
Biphenyl	47000		ug/kg	5000	280	10
4-Chloroaniline	ND		ug/kg	2200	400	10
2-Nitroaniline	ND		ug/kg	2200	420	10
3-Nitroaniline	ND		ug/kg	2200	410	10
4-Nitroaniline	ND		ug/kg	2200	900	10
Dibenzofuran	10000		ug/kg	2200	210	10
2-Methylnaphthalene	410000	E	ug/kg	2600	260	10
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	2200	230	10
Acetophenone	ND		ug/kg	2200	270	10
2,4,6-Trichlorophenol	ND		ug/kg	1300	410	10
p-Chloro-m-cresol	ND		ug/kg	2200	320	10
2-Chlorophenol	ND		ug/kg	2200	260	10
2,4-Dichlorophenol	ND		ug/kg	2000	350	10
2,4-Dimethylphenol	ND		ug/kg	2200	720	10
2-Nitrophenol	ND		ug/kg	4700	820	10
4-Nitrophenol	ND		ug/kg	3000	890	10
2,4-Dinitrophenol	ND		ug/kg	10000	1000	10
4,6-Dinitro-o-cresol	ND		ug/kg	5700	1000	10
Pentachlorophenol	ND		ug/kg	1700	480	10
Phenol	ND		ug/kg	2200	330	10
2-Methylphenol	ND		ug/kg	2200	340	10
3-Methylphenol/4-Methylphenol	ND		ug/kg	3100	340	10

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**SAMPLE RESULTS**

Lab ID: L2316548-08 D

Date Collected: 03/29/23 18:00

Client ID: SB06_12-14

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	2200	420	10
Benzoic Acid	ND		ug/kg	7000	2200	10
Benzyl Alcohol	ND		ug/kg	2200	670	10
Carbazole	4100		ug/kg	2200	210	10
1,4-Dioxane	ND		ug/kg	330	100	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	64		25-120
Phenol-d6	64		10-120
Nitrobenzene-d5	69		23-120
2-Fluorobiphenyl	70		30-120
2,4,6-Tribromophenol	64		10-136
4-Terphenyl-d14	75		18-120

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 17:55
Analyst: MG

Extraction Method: EPA 3546
Extraction Date: 04/01/23 02:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02,06-08 Batch: WG1761490-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	98	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	29.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	28.
3,3'-Dichlorobenzidine	ND		ug/kg	160	43.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	98	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	17.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	26.
Isophorone	ND		ug/kg	150	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	18.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	56.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 17:55
Analyst: MG

Extraction Method: EPA 3546
Extraction Date: 04/01/23 02:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02,06-08 Batch: WG1761490-1					
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	98	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	98	27.
Benzo(k)fluoranthene	ND		ug/kg	98	26.
Chrysene	ND		ug/kg	98	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	98	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	98	20.
Dibenzo(a,h)anthracene	ND		ug/kg	98	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	98	16.
Biphenyl	ND		ug/kg	370	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	31.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	15.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	98	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	350	61.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 17:55
Analyst: MG

Extraction Method: EPA 3546
Extraction Date: 04/01/23 02:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02,06-08 Batch: WG1761490-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	780	76.
4,6-Dinitro-o-cresol	ND		ug/kg	420	78.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	25.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	31.
Benzoic Acid	ND		ug/kg	530	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	24	7.5

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	74		25-120
Phenol-d6	70		10-120
Nitrobenzene-d5	66		23-120
2-Fluorobiphenyl	73		30-120
2,4,6-Tribromophenol	86		10-136
4-Terphenyl-d14	80		18-120

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:25
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 04/01/23 12:41

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 05 Batch: WG1761604-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	98	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	29.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	28.
3,3'-Dichlorobenzidine	ND		ug/kg	160	44.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	98	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	18.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	26.
Isophorone	ND		ug/kg	150	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	19.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	57.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:25
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 04/01/23 12:41

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 05 Batch: WG1761604-1					
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	98	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	98	28.
Benzo(k)fluoranthene	ND		ug/kg	98	26.
Chrysene	ND		ug/kg	98	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	98	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	98	20.
Dibenzo(a,h)anthracene	ND		ug/kg	98	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	98	16.
Biphenyl	ND		ug/kg	370	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	32.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	15.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	98	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	350	62.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:25
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 04/01/23 12:41

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 05 Batch: WG1761604-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	780	76.
4,6-Dinitro-o-cresol	ND		ug/kg	420	78.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	25.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	31.
Benzoic Acid	ND		ug/kg	530	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	24	7.5

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	65		25-120
Phenol-d6	69		10-120
Nitrobenzene-d5	68		23-120
2-Fluorobiphenyl	57		30-120
2,4,6-Tribromophenol	57		10-136
4-Terphenyl-d14	56		18-120

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 01:55
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 04/04/23 02:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1762302-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	99	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	30.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	29.
3,3'-Dichlorobenzidine	ND		ug/kg	160	44.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	99	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	18.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	27.
Isophorone	ND		ug/kg	150	21.
Naphthalene	44	J	ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	19.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	57.
Butyl benzyl phthalate	ND		ug/kg	160	42.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 01:55
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 04/04/23 02:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1762302-1					
Dimethyl phthalate	ND		ug/kg	160	35.
Benzo(a)anthracene	ND		ug/kg	99	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	99	28.
Benzo(k)fluoranthene	ND		ug/kg	99	26.
Chrysene	ND		ug/kg	99	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	99	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	99	20.
Dibenzo(a,h)anthracene	ND		ug/kg	99	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	99	16.
Biphenyl	ND		ug/kg	380	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	32.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	16.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	99	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	20.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	360	62.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 01:55
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 04/04/23 02:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1762302-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	790	77.
4,6-Dinitro-o-cresol	ND		ug/kg	430	79.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	26.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	32.
Benzoic Acid	ND		ug/kg	530	170
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	25	7.6

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	86		25-120
Phenol-d6	83		10-120
Nitrobenzene-d5	74		23-120
2-Fluorobiphenyl	85		30-120
2,4,6-Tribromophenol	89		10-136
4-Terphenyl-d14	97		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 Batch: WG1761490-2 WG1761490-3								
Acenaphthene	69		67		31-137	3		50
1,2,4-Trichlorobenzene	70		66		38-107	6		50
Hexachlorobenzene	73		70		40-140	4		50
Bis(2-chloroethyl)ether	66		62		40-140	6		50
2-Chloronaphthalene	69		67		40-140	3		50
1,2-Dichlorobenzene	69		61		40-140	12		50
1,3-Dichlorobenzene	69		62		40-140	11		50
1,4-Dichlorobenzene	65		62		28-104	5		50
3,3'-Dichlorobenzidine	56		58		40-140	4		50
2,4-Dinitrotoluene	69		67		40-132	3		50
2,6-Dinitrotoluene	69		69		40-140	0		50
Fluoranthene	70		66		40-140	6		50
4-Chlorophenyl phenyl ether	72		70		40-140	3		50
4-Bromophenyl phenyl ether	74		73		40-140	1		50
Bis(2-chloroisopropyl)ether	66		63		40-140	5		50
Bis(2-chloroethoxy)methane	67		64		40-117	5		50
Hexachlorobutadiene	71		69		40-140	3		50
Hexachlorocyclopentadiene	192	Q	188	Q	40-140	2		50
Hexachloroethane	62		56		40-140	10		50
Isophorone	64		62		40-140	3		50
Naphthalene	66		63		40-140	5		50
Nitrobenzene	64		60		40-140	6		50
NDPA/DPA	73		69		36-157	6		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 Batch: WG1761490-2 WG1761490-3								
n-Nitrosodi-n-propylamine	68		67		32-121	1		50
Bis(2-ethylhexyl)phthalate	77		75		40-140	3		50
Butyl benzyl phthalate	69		67		40-140	3		50
Di-n-butylphthalate	71		69		40-140	3		50
Di-n-octylphthalate	77		75		40-140	3		50
Diethyl phthalate	71		68		40-140	4		50
Dimethyl phthalate	69		70		40-140	1		50
Benzo(a)anthracene	71		70		40-140	1		50
Benzo(a)pyrene	71		67		40-140	6		50
Benzo(b)fluoranthene	76		64		40-140	17		50
Benzo(k)fluoranthene	70		71		40-140	1		50
Chrysene	70		68		40-140	3		50
Acenaphthylene	69		69		40-140	0		50
Anthracene	70		68		40-140	3		50
Benzo(ghi)perylene	76		70		40-140	8		50
Fluorene	70		68		40-140	3		50
Phenanthrene	69		66		40-140	4		50
Dibenzo(a,h)anthracene	74		70		40-140	6		50
Indeno(1,2,3-cd)pyrene	81		76		40-140	6		50
Pyrene	69		65		35-142	6		50
Biphenyl	74		74		37-127	0		50
4-Chloroaniline	34	Q	35	Q	40-140	3		50
2-Nitroaniline	69		68		47-134	1		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 Batch: WG1761490-2 WG1761490-3								
3-Nitroaniline	44		43		26-129	2		50
4-Nitroaniline	68		67		41-125	1		50
Dibenzofuran	71		68		40-140	4		50
2-Methylnaphthalene	72		69		40-140	4		50
1,2,4,5-Tetrachlorobenzene	74		72		40-117	3		50
Acetophenone	74		69		14-144	7		50
2,4,6-Trichlorophenol	81		79		30-130	3		50
p-Chloro-m-cresol	68		68		26-103	0		50
2-Chlorophenol	70		67		25-102	4		50
2,4-Dichlorophenol	72		71		30-130	1		50
2,4-Dimethylphenol	68		67		30-130	1		50
2-Nitrophenol	72		68		30-130	6		50
4-Nitrophenol	89		84		11-114	6		50
2,4-Dinitrophenol	77		70		4-130	10		50
4,6-Dinitro-o-cresol	80		77		10-130	4		50
Pentachlorophenol	103		98		17-109	5		50
Phenol	67		64		26-90	5		50
2-Methylphenol	65		62		30-130.	5		50
3-Methylphenol/4-Methylphenol	69		66		30-130	4		50
2,4,5-Trichlorophenol	78		80		30-130	3		50
Benzoic Acid	49		55		10-110	12		50
Benzyl Alcohol	69		65		40-140	6		50
Carbazole	72		67		54-128	7		50

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 Batch: WG1761490-2 WG1761490-3								
1,4-Dioxane	48		45		40-140	6		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	74		66		25-120
Phenol-d6	70		64		10-120
Nitrobenzene-d5	64		60		23-120
2-Fluorobiphenyl	69		70		30-120
2,4,6-Tribromophenol	85		79		10-136
4-Terphenyl-d14	73		69		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG1761604-2 WG1761604-3								
Acenaphthene	76		77		31-137	1		50
1,2,4-Trichlorobenzene	69		75		38-107	8		50
Hexachlorobenzene	76		73		40-140	4		50
Bis(2-chloroethyl)ether	78		86		40-140	10		50
2-Chloronaphthalene	76		75		40-140	1		50
1,2-Dichlorobenzene	66		73		40-140	10		50
1,3-Dichlorobenzene	64		72		40-140	12		50
1,4-Dichlorobenzene	65		73		28-104	12		50
3,3'-Dichlorobenzidine	73		65		40-140	12		50
2,4-Dinitrotoluene	79		78		40-132	1		50
2,6-Dinitrotoluene	75		74		40-140	1		50
Fluoranthene	76		75		40-140	1		50
4-Chlorophenyl phenyl ether	73		72		40-140	1		50
4-Bromophenyl phenyl ether	73		72		40-140	1		50
Bis(2-chloroisopropyl)ether	88		98		40-140	11		50
Bis(2-chloroethoxy)methane	85		92		40-117	8		50
Hexachlorobutadiene	59		61		40-140	3		50
Hexachlorocyclopentadiene	61		63		40-140	3		50
Hexachloroethane	65		75		40-140	14		50
Isophorone	83		89		40-140	7		50
Naphthalene	71		74		40-140	4		50
Nitrobenzene	84		92		40-140	9		50
NDPA/DPA	82		81		36-157	1		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG1761604-2 WG1761604-3								
n-Nitrosodi-n-propylamine	88		98		32-121	11		50
Bis(2-ethylhexyl)phthalate	91		88		40-140	3		50
Butyl benzyl phthalate	84		84		40-140	0		50
Di-n-butylphthalate	84		82		40-140	2		50
Di-n-octylphthalate	91		87		40-140	4		50
Diethyl phthalate	83		83		40-140	0		50
Dimethyl phthalate	76		75		40-140	1		50
Benzo(a)anthracene	78		76		40-140	3		50
Benzo(a)pyrene	78		74		40-140	5		50
Benzo(b)fluoranthene	73		68		40-140	7		50
Benzo(k)fluoranthene	77		75		40-140	3		50
Chrysene	78		74		40-140	5		50
Acenaphthylene	83		82		40-140	1		50
Anthracene	77		77		40-140	0		50
Benzo(ghi)perylene	71		67		40-140	6		50
Fluorene	79		78		40-140	1		50
Phenanthrene	75		74		40-140	1		50
Dibenzo(a,h)anthracene	69		68		40-140	1		50
Indeno(1,2,3-cd)pyrene	72		71		40-140	1		50
Pyrene	78		76		35-142	3		50
Biphenyl	76		75		37-127	1		50
4-Chloroaniline	89		81		40-140	9		50
2-Nitroaniline	84		80		47-134	5		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG1761604-2 WG1761604-3								
3-Nitroaniline	80		76		26-129	5		50
4-Nitroaniline	83		84		41-125	1		50
Dibenzofuran	78		77		40-140	1		50
2-Methylnaphthalene	72		74		40-140	3		50
1,2,4,5-Tetrachlorobenzene	69		71		40-117	3		50
Acetophenone	83		91		14-144	9		50
2,4,6-Trichlorophenol	77		76		30-130	1		50
p-Chloro-m-cresol	87		85		26-103	2		50
2-Chlorophenol	77		84		25-102	9		50
2,4-Dichlorophenol	81		86		30-130	6		50
2,4-Dimethylphenol	84		90		30-130	7		50
2-Nitrophenol	77		85		30-130	10		50
4-Nitrophenol	106		102		11-114	4		50
2,4-Dinitrophenol	79		78		4-130	1		50
4,6-Dinitro-o-cresol	87		82		10-130	6		50
Pentachlorophenol	88		85		17-109	3		50
Phenol	86		92	Q	26-90	7		50
2-Methylphenol	84		91		30-130	8		50
3-Methylphenol/4-Methylphenol	93		102		30-130	9		50
2,4,5-Trichlorophenol	80		80		30-130	0		50
Benzoic Acid	92		80		10-110	14		50
Benzyl Alcohol	92		99		40-140	7		50
Carbazole	80		76		54-128	5		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG1761604-2 WG1761604-3								
1,4-Dioxane	52		57		40-140	9		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	79		88		25-120
Phenol-d6	84		90		10-120
Nitrobenzene-d5	82		89		23-120
2-Fluorobiphenyl	72		72		30-120
2,4,6-Tribromophenol	78		76		10-136
4-Terphenyl-d14	69		67		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1762302-2 WG1762302-3								
Acenaphthene	66		77		31-137	15		50
1,2,4-Trichlorobenzene	70		79		38-107	12		50
Hexachlorobenzene	76		91		40-140	18		50
Bis(2-chloroethyl)ether	62		74		40-140	18		50
2-Chloronaphthalene	70		85		40-140	19		50
1,2-Dichlorobenzene	65		78		40-140	18		50
1,3-Dichlorobenzene	63		77		40-140	20		50
1,4-Dichlorobenzene	63		76		28-104	19		50
3,3'-Dichlorobenzidine	58		64		40-140	10		50
2,4-Dinitrotoluene	76		88		40-132	15		50
2,6-Dinitrotoluene	72		86		40-140	18		50
Fluoranthene	74		86		40-140	15		50
4-Chlorophenyl phenyl ether	72		84		40-140	15		50
4-Bromophenyl phenyl ether	76		88		40-140	15		50
Bis(2-chloroisopropyl)ether	52		63		40-140	19		50
Bis(2-chloroethoxy)methane	67		76		40-117	13		50
Hexachlorobutadiene	64		76		40-140	17		50
Hexachlorocyclopentadiene	74		88		40-140	17		50
Hexachloroethane	54		65		40-140	18		50
Isophorone	63		74		40-140	16		50
Naphthalene	71		84		40-140	17		50
Nitrobenzene	62		72		40-140	15		50
NDPA/DPA	74		87		36-157	16		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1762302-2 WG1762302-3								
n-Nitrosodi-n-propylamine	61		72		32-121	17		50
Bis(2-ethylhexyl)phthalate	70		82		40-140	16		50
Butyl benzyl phthalate	74		85		40-140	14		50
Di-n-butylphthalate	74		85		40-140	14		50
Di-n-octylphthalate	70		83		40-140	17		50
Diethyl phthalate	69		80		40-140	15		50
Dimethyl phthalate	70		83		40-140	17		50
Benzo(a)anthracene	72		84		40-140	15		50
Benzo(a)pyrene	84		101		40-140	18		50
Benzo(b)fluoranthene	75		90		40-140	18		50
Benzo(k)fluoranthene	80		95		40-140	17		50
Chrysene	71		83		40-140	16		50
Acenaphthylene	77		91		40-140	17		50
Anthracene	73		87		40-140	18		50
Benzo(ghi)perylene	73		82		40-140	12		50
Fluorene	71		84		40-140	17		50
Phenanthrene	72		84		40-140	15		50
Dibenzo(a,h)anthracene	78		86		40-140	10		50
Indeno(1,2,3-cd)pyrene	76		85		40-140	11		50
Pyrene	74		85		35-142	14		50
Biphenyl	72		86		37-127	18		50
4-Chloroaniline	47		48		40-140	2		50
2-Nitroaniline	75		88		47-134	16		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1762302-2 WG1762302-3								
3-Nitroaniline	53		59		26-129	11		50
4-Nitroaniline	73		82		41-125	12		50
Dibenzofuran	72		84		40-140	15		50
2-Methylnaphthalene	70		84		40-140	18		50
1,2,4,5-Tetrachlorobenzene	72		86		40-117	18		50
Acetophenone	70		84		14-144	18		50
2,4,6-Trichlorophenol	79		94		30-130	17		50
p-Chloro-m-cresol	70		83		26-103	17		50
2-Chlorophenol	67		80		25-102	18		50
2,4-Dichlorophenol	76		83		30-130	9		50
2,4-Dimethylphenol	69		78		30-130	12		50
2-Nitrophenol	71		81		30-130	13		50
4-Nitrophenol	69		79		11-114	14		50
2,4-Dinitrophenol	73		84		4-130	14		50
4,6-Dinitro-o-cresol	79		90		10-130	13		50
Pentachlorophenol	84		98		17-109	15		50
Phenol	72		88		26-90	20		50
2-Methylphenol	68		82		30-130.	19		50
3-Methylphenol/4-Methylphenol	71		84		30-130	17		50
2,4,5-Trichlorophenol	81		98		30-130	19		50
Benzoic Acid	60		62		10-110	3		50
Benzyl Alcohol	68		81		40-140	17		50
Carbazole	76		88		54-128	15		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1762302-2 WG1762302-3								
1,4-Dioxane	38	Q	45		40-140	17		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	71		86		25-120
Phenol-d6	70		85		10-120
Nitrobenzene-d5	64		74		23-120
2-Fluorobiphenyl	73		88		30-120
2,4,6-Tribromophenol	84		101		10-136
4-Terphenyl-d14	78		92		18-120

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 QC Batch ID: WG1761490-4 WG1761490-5 QC Sample: L2316548-07 Client ID: SB06_0-2												
Acenaphthene	71J	1430	1100	77		1000	71		31-137	10		50
1,2,4-Trichlorobenzene	ND	1430	1100	77		1000	71		38-107	10		50
Hexachlorobenzene	ND	1430	1100	77		1000	71		40-140	10		50
Bis(2-chloroethyl)ether	30J	1430	1000	70		990	70		40-140	1		50
2-Chloronaphthalene	ND	1430	1000	70		1000	71		40-140	0		50
1,2-Dichlorobenzene	ND	1430	1100	77		1000	71		40-140	10		50
1,3-Dichlorobenzene	ND	1430	1000	70		1000	71		40-140	0		50
1,4-Dichlorobenzene	ND	1430	1000	70		990	70		28-104	1		50
3,3'-Dichlorobenzidine	ND	1430	1100	77		1000	71		40-140	10		50
2,4-Dinitrotoluene	ND	1430	950	67		980	69		40-132	3		50
2,6-Dinitrotoluene	ND	1430	960	67		960	68		40-140	0		50
Fluoranthene	23J	1430	1100	77		1000	71		40-140	10		50
4-Chlorophenyl phenyl ether	ND	1430	1100	77		1000	71		40-140	10		50
4-Bromophenyl phenyl ether	ND	1430	1100	77		1000	71		40-140	10		50
Bis(2-chloroisopropyl)ether	ND	1430	990	69		950	67		40-140	4		50
Bis(2-chloroethoxy)methane	ND	1430	1000	70		960	68		40-117	4		50
Hexachlorobutadiene	ND	1430	1100	77		1000	71		40-140	10		50
Hexachlorocyclopentadiene	ND	1430	1200	84		1200	85		40-140	0		50
Hexachloroethane	ND	1430	840	59		830	59		40-140	1		50
Isophorone	ND	1430	960	67		910	64		40-140	5		50
Naphthalene	ND	1430	1000	70		1000	71		40-140	0		50
Nitrobenzene	ND	1430	950	67		940	67		40-140	1		50
NDPA/DPA	ND	1430	1100	77		1000	71		36-157	10		50

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 QC Batch ID: WG1761490-4 WG1761490-5 QC Sample: L2316548-07 Client ID: SB06_0-2												
n-Nitrosodi-n-propylamine	ND	1430	1000	70		1000	71		32-121	0		50
Bis(2-ethylhexyl)phthalate	ND	1430	1000	70		980	69		40-140	2		50
Butyl benzyl phthalate	ND	1430	1100	77		1000	71		40-140	10		50
Di-n-butylphthalate	ND	1430	1100	77		1000	71		40-140	10		50
Di-n-octylphthalate	ND	1430	1100	77		1000	71		40-140	10		50
Diethyl phthalate	ND	1430	1000	70		1000	71		40-140	0		50
Dimethyl phthalate	ND	1430	1000	70		1000	71		40-140	0		50
Benzo(a)anthracene	ND	1430	1100	77		1000	71		40-140	10		50
Benzo(a)pyrene	ND	1430	1200	84		1100	78		40-140	9		50
Benzo(b)fluoranthene	ND	1430	1100	77		1100	78		40-140	0		50
Benzo(k)fluoranthene	ND	1430	1200	84		1100	78		40-140	9		50
Chrysene	ND	1430	1000	70		1000	71		40-140	0		50
Acenaphthylene	200	1430	1200	70		1100	64		40-140	9		50
Anthracene	ND	1430	1100	77		1000	71		40-140	10		50
Benzo(ghi)perylene	ND	1430	1200	84		1100	78		40-140	9		50
Fluorene	38J	1430	1100	77		1000	71		40-140	10		50
Phenanthrene	ND	1430	1100	77		1000	71		40-140	10		50
Dibenzo(a,h)anthracene	ND	1430	1100	77		1000	71		40-140	10		50
Indeno(1,2,3-cd)pyrene	ND	1430	1200	84		1100	78		40-140	9		50
Pyrene	26J	1430	1200	84		1100	78		35-142	9		50
Biphenyl	ND	1430	1100	77		1100	78		37-127	0		50
4-Chloroaniline	ND	1430	470	33	Q	560	40		40-140	17		50
2-Nitroaniline	ND	1430	1000	70		1000	71		47-134	0		50

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 QC Batch ID: WG1761490-4 WG1761490-5 QC Sample: L2316548-07 Client ID: SB06_0-2												
3-Nitroaniline	ND	1430	910	64		860	61		26-129	6		50
4-Nitroaniline	ND	1430	1100	77		1100	78		41-125	0		50
Dibenzofuran	ND	1430	1100	77		1000	71		40-140	10		50
2-Methylnaphthalene	ND	1430	1100	77		1100	78		40-140	0		50
1,2,4,5-Tetrachlorobenzene	ND	1430	1100	77		1100	78		40-117	0		50
Acetophenone	ND	1430	1100	77		1100	78		14-144	0		50
2,4,6-Trichlorophenol	ND	1430	1200	84		1200	85		30-130	0		50
p-Chloro-m-cresol	ND	1430	1000	70		1000	71		26-103	0		50
2-Chlorophenol	ND	1430	1000	70		1000	71		25-102	0		50
2,4-Dichlorophenol	ND	1430	1100	77		1000	71		30-130	10		50
2,4-Dimethylphenol	ND	1430	940	66		880	62		30-130	7		50
2-Nitrophenol	ND	1430	1000	70		970	69		30-130	3		50
4-Nitrophenol	ND	1430	1300	91		1200	85		11-114	8		50
2,4-Dinitrophenol	ND	1430	360J	25		370J	26		4-130	3		50
4,6-Dinitro-o-cresol	ND	1430	400J	28		450J	32		10-130	12		50
Pentachlorophenol	ND	1430	1700	120	Q	1700	120	Q	17-109	0		50
Phenol	ND	1430	990	69		950	67		26-90	4		50
2-Methylphenol	ND	1430	940	66		910	64		30-130	3		50
3-Methylphenol/4-Methylphenol	ND	1430	980	69		960	68		30-130	2		50
2,4,5-Trichlorophenol	ND	1430	1200	84		1200	85		30-130	0		50
Benzoic Acid	ND	1430	480J	34		460J	33		10-110	4		50
Benzyl Alcohol	ND	1430	1000	70		990	70		40-140	1		50
Carbazole	ND	1430	1100	77		1100	78		54-128	0		50

Matrix Spike Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,06-08 QC Batch ID: WG1761490-4 WG1761490-5 QC Sample: L2316548-07 Client ID: SB06_0-2												
1,4-Dioxane	ND	1430	790	55		730	52		40-140	8		50

Surrogate	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	91		89		10-136
2-Fluorobiphenyl	72		69		30-120
2-Fluorophenol	78		74		25-120
4-Terphenyl-d14	78		67		18-120
Nitrobenzene-d5	67		66		23-120
Phenol-d6	70		69		10-120

PCBS

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07
Client ID: SB06_0-2
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8082A
Analytical Date: 04/03/23 10:10
Analyst: RMP
Percent Solids: 92%

Extraction Method: EPA 3546
Extraction Date: 04/02/23 01:02
Cleanup Method: EPA 3665A
Cleanup Date: 04/02/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/02/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	34.8	3.09	1	A
Aroclor 1221	ND		ug/kg	34.8	3.48	1	A
Aroclor 1232	ND		ug/kg	34.8	7.37	1	A
Aroclor 1242	ND		ug/kg	34.8	4.69	1	A
Aroclor 1248	ND		ug/kg	34.8	5.22	1	A
Aroclor 1254	ND		ug/kg	34.8	3.80	1	A
Aroclor 1260	ND		ug/kg	34.8	6.42	1	A
Aroclor 1262	ND		ug/kg	34.8	4.42	1	A
Aroclor 1268	ND		ug/kg	34.8	3.60	1	A
PCBs, Total	ND		ug/kg	34.8	3.09	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	63		30-150	A
Decachlorobiphenyl	68		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		30-150	B
Decachlorobiphenyl	67		30-150	B

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-08
Client ID: SB06_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 18:00
Date Received: 03/29/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8082A
Analytical Date: 04/03/23 20:17
Analyst: MEO
Percent Solids: 76%

Extraction Method: EPA 3546
Extraction Date: 04/02/23 01:02
Cleanup Method: EPA 3665A
Cleanup Date: 04/02/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/02/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	43.6	3.87	1	A
Aroclor 1221	ND		ug/kg	43.6	4.36	1	A
Aroclor 1232	ND		ug/kg	43.6	9.24	1	A
Aroclor 1242	ND		ug/kg	43.6	5.87	1	A
Aroclor 1248	ND		ug/kg	43.6	6.54	1	A
Aroclor 1254	ND		ug/kg	43.6	4.77	1	A
Aroclor 1260	ND		ug/kg	43.6	8.05	1	A
Aroclor 1262	ND		ug/kg	43.6	5.53	1	A
Aroclor 1268	ND		ug/kg	43.6	4.51	1	A
PCBs, Total	ND		ug/kg	43.6	3.87	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	49		30-150	A
Decachlorobiphenyl	48		30-150	A
2,4,5,6-Tetrachloro-m-xylene	23	Q	30-150	B
Decachlorobiphenyl	25	Q	30-150	B

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316548
Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
Analytical Date: 04/02/23 11:26
Analyst: SDC

Extraction Method: EPA 3546
Extraction Date: 04/01/23 10:14
Cleanup Method: EPA 3665A
Cleanup Date: 04/01/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/02/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 07-08 Batch: WG1761576-1						
Aroclor 1016	ND		ug/kg	32.3	2.87	A
Aroclor 1221	ND		ug/kg	32.3	3.24	A
Aroclor 1232	ND		ug/kg	32.3	6.85	A
Aroclor 1242	ND		ug/kg	32.3	4.35	A
Aroclor 1248	ND		ug/kg	32.3	4.84	A
Aroclor 1254	ND		ug/kg	32.3	3.53	A
Aroclor 1260	ND		ug/kg	32.3	5.97	A
Aroclor 1262	ND		ug/kg	32.3	4.10	A
Aroclor 1268	ND		ug/kg	32.3	3.35	A
PCBs, Total	ND		ug/kg	32.3	2.87	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	79		30-150	A
2,4,5,6-Tetrachloro-m-xylene	84		30-150	B
Decachlorobiphenyl	79		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 07-08 Batch: WG1761576-2 WG1761576-3									
Aroclor 1016	65		77		40-140	17		50	A
Aroclor 1260	59		66		40-140	11		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	67		74		30-150	A
Decachlorobiphenyl	66		70		30-150	A
2,4,5,6-Tetrachloro-m-xylene	72		78		30-150	B
Decachlorobiphenyl	69		74		30-150	B

Matrix Spike Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316548**Report Date:** 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 07-08 QC Batch ID: WG1761576-4 WG1761576-5 QC Sample: L2316548-07 Client ID: SB06_0-2													
Aroclor 1016	ND	214	141	66		152	69		40-140	8		50	A
Aroclor 1260	ND	214	132	62		142	64		40-140	7		50	A

Surrogate	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	70		72		30-150	A
Decachlorobiphenyl	73		75		30-150	A
2,4,5,6-Tetrachloro-m-xylene	72		74		30-150	B
Decachlorobiphenyl	73		76		30-150	B

METALS

Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01

Date Collected: 03/29/23 09:40

Client ID: SB04_2-4

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	6440		mg/kg	9.52	2.57	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Antimony, Total	0.370	J	mg/kg	4.76	0.362	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Arsenic, Total	7.40		mg/kg	0.952	0.198	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Barium, Total	92.2		mg/kg	0.952	0.166	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Beryllium, Total	0.089	J	mg/kg	0.476	0.031	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Cadmium, Total	0.920	J	mg/kg	0.952	0.093	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Calcium, Total	33500		mg/kg	9.52	3.33	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Chromium, Total	26.5		mg/kg	0.952	0.091	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Cobalt, Total	3.99		mg/kg	1.90	0.158	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Copper, Total	74.8		mg/kg	0.952	0.246	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Iron, Total	14300		mg/kg	4.76	0.859	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Lead, Total	187		mg/kg	4.76	0.255	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Magnesium, Total	4390		mg/kg	9.52	1.46	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Manganese, Total	164		mg/kg	0.952	0.151	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Mercury, Total	0.424		mg/kg	0.078	0.051	1	04/04/23 06:45	04/04/23 22:05	EPA 7471B	1,7471B	DMB
Nickel, Total	19.0		mg/kg	2.38	0.230	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Potassium, Total	1100		mg/kg	238	13.7	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Selenium, Total	0.477	J	mg/kg	1.90	0.246	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Silver, Total	0.578		mg/kg	0.476	0.269	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Sodium, Total	234		mg/kg	190	3.00	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Thallium, Total	ND		mg/kg	1.90	0.300	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Vanadium, Total	26.0		mg/kg	0.952	0.193	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW
Zinc, Total	238		mg/kg	4.76	0.279	2	04/04/23 06:05	04/04/23 13:34	EPA 3050B	1,6010D	AMW

General Chemistry - Mansfield Lab

Chromium, Trivalent	26.5		mg/kg	0.995	0.995	1		04/05/23 13:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-02

Date Collected: 03/29/23 09:50

Client ID: SB04_13-15

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	4360		mg/kg	9.69	2.62	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Antimony, Total	ND		mg/kg	4.84	0.368	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Arsenic, Total	2.70		mg/kg	0.969	0.201	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Barium, Total	7.78		mg/kg	0.969	0.168	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Beryllium, Total	0.167	J	mg/kg	0.484	0.032	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Cadmium, Total	ND		mg/kg	0.969	0.095	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Calcium, Total	896		mg/kg	9.69	3.39	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Chromium, Total	10.1		mg/kg	0.969	0.093	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Cobalt, Total	1.91	J	mg/kg	1.94	0.161	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Copper, Total	3.94		mg/kg	0.969	0.250	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Iron, Total	6610		mg/kg	4.84	0.875	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Lead, Total	3.18	J	mg/kg	4.84	0.260	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Magnesium, Total	1810		mg/kg	9.69	1.49	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Manganese, Total	58.2		mg/kg	0.969	0.154	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Mercury, Total	ND		mg/kg	0.080	0.052	1	04/04/23 06:45	04/04/23 21:39	EPA 7471B	1,7471B	DMB
Nickel, Total	6.40		mg/kg	2.42	0.234	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Potassium, Total	944		mg/kg	242	13.9	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Selenium, Total	0.386	J	mg/kg	1.94	0.250	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Silver, Total	ND		mg/kg	0.484	0.274	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Sodium, Total	594		mg/kg	194	3.05	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Thallium, Total	ND		mg/kg	1.94	0.305	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Vanadium, Total	17.5		mg/kg	0.969	0.197	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW
Zinc, Total	16.0		mg/kg	4.84	0.284	2	04/04/23 06:05	04/04/23 15:08	EPA 3050B	1,6010D	AMW

General Chemistry - Mansfield Lab

Chromium, Trivalent	10.1		mg/kg	0.986	0.986	1		04/05/23 13:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-05

Date Collected: 03/29/23 15:55

Client ID: SB07_0-2

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	6770		mg/kg	8.60	2.32	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Antimony, Total	ND		mg/kg	4.30	0.327	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Arsenic, Total	4.76		mg/kg	0.860	0.179	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Barium, Total	59.4		mg/kg	0.860	0.150	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Beryllium, Total	0.073	J	mg/kg	0.430	0.028	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Cadmium, Total	0.111	J	mg/kg	0.860	0.084	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Calcium, Total	14400		mg/kg	8.60	3.01	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Chromium, Total	14.6		mg/kg	0.860	0.083	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Cobalt, Total	6.73		mg/kg	1.72	0.143	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Copper, Total	33.0		mg/kg	0.860	0.222	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Iron, Total	14500		mg/kg	4.30	0.776	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Lead, Total	86.0		mg/kg	4.30	0.230	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Magnesium, Total	4190		mg/kg	8.60	1.32	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Manganese, Total	212		mg/kg	0.860	0.137	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Mercury, Total	ND		mg/kg	0.070	0.046	1	04/04/23 06:45	04/04/23 21:42	EPA 7471B	1,7471B	DMB
Nickel, Total	28.2		mg/kg	2.15	0.208	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Potassium, Total	1630		mg/kg	215	12.4	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Selenium, Total	0.346	J	mg/kg	1.72	0.222	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Silver, Total	ND		mg/kg	0.430	0.243	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Sodium, Total	153	J	mg/kg	172	2.71	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Thallium, Total	ND		mg/kg	1.72	0.271	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Vanadium, Total	19.2		mg/kg	0.860	0.174	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW
Zinc, Total	129		mg/kg	4.30	0.252	2	04/04/23 06:05	04/04/23 15:13	EPA 3050B	1,6010D	AMW

General Chemistry - Mansfield Lab

Chromium, Trivalent	14.6		mg/kg	0.883	0.883	1		04/05/23 13:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-06

Date Collected: 03/29/23 16:05

Client ID: SB07_5-6.5

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	7350		mg/kg	9.70	2.62	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Antimony, Total	0.861	J	mg/kg	4.85	0.369	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Arsenic, Total	11.6		mg/kg	0.970	0.202	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Barium, Total	102		mg/kg	0.970	0.169	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Beryllium, Total	0.073	J	mg/kg	0.485	0.032	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Cadmium, Total	1.30		mg/kg	0.970	0.095	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Calcium, Total	45600		mg/kg	9.70	3.40	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Chromium, Total	35.4		mg/kg	0.970	0.093	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Cobalt, Total	5.40		mg/kg	1.94	0.161	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Copper, Total	152		mg/kg	0.970	0.250	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Iron, Total	15600		mg/kg	4.85	0.876	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Lead, Total	263		mg/kg	4.85	0.260	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Magnesium, Total	8330		mg/kg	9.70	1.49	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Manganese, Total	210		mg/kg	0.970	0.154	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Mercury, Total	0.611		mg/kg	0.080	0.052	1	04/04/23 06:45	04/04/23 21:52	EPA 7471B	1,7471B	DMB
Nickel, Total	25.8		mg/kg	2.43	0.235	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Potassium, Total	1390		mg/kg	243	14.0	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Selenium, Total	0.613	J	mg/kg	1.94	0.250	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Silver, Total	1.12		mg/kg	0.485	0.275	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Sodium, Total	375		mg/kg	194	3.06	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Thallium, Total	ND		mg/kg	1.94	0.306	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Vanadium, Total	31.0		mg/kg	0.970	0.197	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW
Zinc, Total	306		mg/kg	4.85	0.284	2	04/04/23 06:05	04/04/23 15:17	EPA 3050B	1,6010D	AMW

General Chemistry - Mansfield Lab

Chromium, Trivalent	35.4		mg/kg	1.01	1.01	1		04/05/23 13:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07

Date Collected: 03/29/23 17:40

Client ID: SB06_0-2

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	11200		mg/kg	8.23	2.22	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Antimony, Total	ND		mg/kg	4.11	0.313	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Arsenic, Total	3.18		mg/kg	0.823	0.171	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Barium, Total	97.3		mg/kg	0.823	0.143	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Beryllium, Total	ND		mg/kg	0.411	0.027	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Cadmium, Total	ND		mg/kg	0.823	0.081	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Calcium, Total	2320		mg/kg	8.23	2.88	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Chromium, Total	23.8		mg/kg	0.823	0.079	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Cobalt, Total	5.06		mg/kg	1.64	0.136	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Copper, Total	20.3		mg/kg	0.823	0.212	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Iron, Total	20400		mg/kg	4.11	0.743	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Lead, Total	12.2		mg/kg	4.11	0.220	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Magnesium, Total	6150		mg/kg	8.23	1.27	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Manganese, Total	113		mg/kg	0.823	0.131	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Mercury, Total	ND		mg/kg	0.068	0.044	1	04/04/23 06:45	04/04/23 20:10	EPA 7471B	1,7471B	DMB
Nickel, Total	11.1		mg/kg	2.06	0.199	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Potassium, Total	5990		mg/kg	206	11.8	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Selenium, Total	0.709	J	mg/kg	1.64	0.212	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Silver, Total	ND		mg/kg	0.411	0.233	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Sodium, Total	215		mg/kg	164	2.59	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Thallium, Total	0.805	J	mg/kg	1.64	0.259	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Vanadium, Total	36.2		mg/kg	0.823	0.167	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW
Zinc, Total	57.3		mg/kg	4.11	0.241	2	04/04/23 06:05	04/04/23 11:58	EPA 3050B	1,6010D	AMW

General Chemistry - Mansfield Lab

Chromium, Trivalent	23.8		mg/kg	0.867	0.867	1		04/05/23 13:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-08

Date Collected: 03/29/23 18:00

Client ID: SB06_12-14

Date Received: 03/29/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	1290		mg/kg	10.2	2.74	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Antimony, Total	ND		mg/kg	5.08	0.386	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Arsenic, Total	1.16		mg/kg	1.02	0.211	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Barium, Total	3.76		mg/kg	1.02	0.177	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Beryllium, Total	ND		mg/kg	0.508	0.034	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Cadmium, Total	ND		mg/kg	1.02	0.100	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Calcium, Total	1430		mg/kg	10.2	3.56	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Chromium, Total	3.88		mg/kg	1.02	0.098	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Cobalt, Total	0.935	J	mg/kg	2.03	0.169	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Copper, Total	4.85		mg/kg	1.02	0.262	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Iron, Total	2820		mg/kg	5.08	0.918	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Lead, Total	5.35		mg/kg	5.08	0.272	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Magnesium, Total	589		mg/kg	10.2	1.56	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Manganese, Total	24.5		mg/kg	1.02	0.162	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Mercury, Total	ND		mg/kg	0.083	0.054	1	04/04/23 06:45	04/04/23 21:55	EPA 7471B	1,7471B	DMB
Nickel, Total	3.66		mg/kg	2.54	0.246	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Potassium, Total	285		mg/kg	254	14.6	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Selenium, Total	0.277	J	mg/kg	2.03	0.262	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Silver, Total	ND		mg/kg	0.508	0.288	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Sodium, Total	237		mg/kg	203	3.20	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Thallium, Total	ND		mg/kg	2.03	0.320	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Vanadium, Total	3.98		mg/kg	1.02	0.206	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW
Zinc, Total	9.24		mg/kg	5.08	0.298	2	04/04/23 06:05	04/04/23 15:22	EPA 3050B	1,6010D	AMW

General Chemistry - Mansfield Lab

Chromium, Trivalent	3.88		mg/kg	1.06	1.06	1		04/05/23 13:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02,05-08 Batch: WG1760842-1										
Aluminum, Total	ND		mg/kg	4.00	1.08	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Antimony, Total	ND		mg/kg	2.00	0.152	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Arsenic, Total	ND		mg/kg	0.400	0.083	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Barium, Total	ND		mg/kg	0.400	0.070	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Beryllium, Total	ND		mg/kg	0.200	0.013	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Cadmium, Total	ND		mg/kg	0.400	0.039	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Calcium, Total	ND		mg/kg	4.00	1.40	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Chromium, Total	ND		mg/kg	0.400	0.038	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Cobalt, Total	ND		mg/kg	0.800	0.066	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Copper, Total	ND		mg/kg	0.400	0.103	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Iron, Total	0.578	J	mg/kg	2.00	0.361	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Lead, Total	ND		mg/kg	2.00	0.107	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Magnesium, Total	ND		mg/kg	4.00	0.616	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Manganese, Total	ND		mg/kg	0.400	0.064	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Nickel, Total	ND		mg/kg	1.00	0.097	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Potassium, Total	ND		mg/kg	100	5.76	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Selenium, Total	0.154	J	mg/kg	0.800	0.103	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Silver, Total	ND		mg/kg	0.200	0.113	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Sodium, Total	ND		mg/kg	80.0	1.26	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Thallium, Total	ND		mg/kg	0.800	0.126	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Vanadium, Total	ND		mg/kg	0.400	0.081	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW
Zinc, Total	0.200	J	mg/kg	2.00	0.117	1	04/04/23 06:05	04/04/23 11:35	1,6010D	AMW

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02,05-08 Batch: WG1760843-1										
Mercury, Total	ND		mg/kg	0.083	0.054	1	04/04/23 06:45	04/04/23 20:04	1,7471B	DMB



Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Prep Information

Digestion Method: EPA 7471B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 Batch: WG1760842-2 SRM Lot Number: D116-540								
Aluminum, Total	87		-		45-155	-		
Antimony, Total	174		-		2-205	-		
Arsenic, Total	110		-		82-119	-		
Barium, Total	97		-		82-118	-		
Beryllium, Total	99		-		82-118	-		
Cadmium, Total	102		-		82-118	-		
Calcium, Total	100		-		81-119	-		
Chromium, Total	99		-		81-118	-		
Cobalt, Total	100		-		83-117	-		
Copper, Total	102		-		83-117	-		
Iron, Total	102		-		58-142	-		
Lead, Total	105		-		83-117	-		
Magnesium, Total	100		-		75-125	-		
Manganese, Total	98		-		82-118	-		
Nickel, Total	100		-		82-118	-		
Potassium, Total	96		-		68-131	-		
Selenium, Total	108		-		78-122	-		
Silver, Total	105		-		79-121	-		
Sodium, Total	101		-		71-130	-		
Thallium, Total	108		-		80-120	-		
Vanadium, Total	100		-		78-122	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 Batch: WG1760842-2 SRM Lot Number: D116-540					
Zinc, Total	103	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 Batch: WG1760843-2 SRM Lot Number: D116-540					
Mercury, Total	99	-	58-142	-	

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1760842-3 WG1760842-4 QC Sample: L2316548-07 Client ID: SB06_0-2												
Aluminum, Total	11200	167	11000	0	Q	10900	0	Q	75-125	1		20
Antimony, Total	ND	41.9	45.6	109		46.1	111		75-125	1		20
Arsenic, Total	3.18	10	14.6	114		14.4	112		75-125	1		20
Barium, Total	97.3	167	246	89		249	91		75-125	1		20
Beryllium, Total	ND	4.19	3.18	76		3.16	76		75-125	1		20
Cadmium, Total	ND	4.44	4.76	107		4.84	110		75-125	2		20
Calcium, Total	2320	837	5710	405	Q	2360	5	Q	75-125	83	Q	20
Chromium, Total	23.8	16.7	37.8	84		38.2	86		75-125	1		20
Cobalt, Total	5.06	41.9	50.6	109		51.4	111		75-125	2		20
Copper, Total	20.3	20.9	40.7	97		40.9	99		75-125	0		20
Iron, Total	20400	83.7	19800	0	Q	19100	0	Q	75-125	4		20
Lead, Total	12.2	44.4	58.3	104		59.8	108		75-125	3		20
Magnesium, Total	6150	837	8050	227	Q	6320	20	Q	75-125	24	Q	20
Manganese, Total	113	41.9	150	88		141	67	Q	75-125	6		20
Nickel, Total	11.1	41.9	54.0	102		54.6	104		75-125	1		20
Potassium, Total	5990	837	6340	42	Q	6570	70	Q	75-125	4		20
Selenium, Total	0.709J	10	11.8	117		11.6	116		75-125	2		20
Silver, Total	ND	4.19	3.80	91		3.80	91		75-125	0		20
Sodium, Total	215	837	1020	96		1010	95		75-125	1		20
Thallium, Total	0.805J	10	11.5	114		11.5	115		75-125	0		20
Vanadium, Total	36.2	41.9	75.0	93		74.4	92		75-125	1		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1760842-3 WG1760842-4 QC Sample: L2316548-07 Client ID: SB06_0-2									
Zinc, Total	57.3	41.9	98.1	97	100	102	75-125	2	20
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1760843-3 WG1760843-4 QC Sample: L2316548-07 Client ID: SB06_0-2									
Mercury, Total	ND	1.36	1.41	104	1.42	102	80-120	1	20

Project Name: 2731 W 12TH ST

Project Number: 170697301

**Lab Serial Dilution
Analysis
Batch Quality Control**

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1760842-6 QC Sample: L2316548-07 Client ID: SB06_0-2						
Aluminum, Total	11200	11400	mg/kg	2		20
Barium, Total	97.3	100	mg/kg	3		20
Calcium, Total	2320	2410	mg/kg	4		20
Chromium, Total	23.8	24.7	mg/kg	4		20
Iron, Total	20400	21800	mg/kg	7		20
Magnesium, Total	6150	6240	mg/kg	1		20
Manganese, Total	113	116	mg/kg	3		20
Potassium, Total	5990	6080	mg/kg	2		20
Vanadium, Total	36.2	37.0	mg/kg	2		20

INORGANICS & MISCELLANEOUS

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-01

Client ID: SB04_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 09:40

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	80.4		%	0.100	NA	1	-	03/30/23 11:11	121,2540G	ROI
Cyanide, Total	0.73	J	mg/kg	1.2	0.26	1	04/04/23 11:40	04/05/23 08:45	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.995	0.199	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-02

Client ID: SB04_13-15

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 09:50

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.1		%	0.100	NA	1	-	03/30/23 11:11	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.2	0.26	1	04/04/23 11:40	04/05/23 08:46	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.986	0.197	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-05

Client ID: SB07_0-2

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 15:55

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.6		%	0.100	NA	1	-	03/30/23 11:11	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.0	0.22	1	04/04/23 11:40	04/05/23 08:47	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.883	0.177	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-06

Client ID: SB07_5-6.5

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 16:05

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	79.5		%	0.100	NA	1	-	03/30/23 11:11	121,2540G	ROI
Cyanide, Total	0.58	J	mg/kg	1.2	0.25	1	04/04/23 11:40	04/05/23 09:19	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	1.01	0.201	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-07

Client ID: SB06_0-2

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 17:40

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.3		%	0.100	NA	1	-	03/30/23 11:11	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.0	0.22	1	04/04/23 11:40	04/05/23 09:20	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.867	0.173	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

SAMPLE RESULTS

Lab ID: L2316548-08

Client ID: SB06_12-14

Sample Location: BROOKLYN, NY

Date Collected: 03/29/23 18:00

Date Received: 03/29/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	75.6		%	0.100	NA	1	-	03/30/23 11:11	121,2540G	ROI
Cyanide, Total	4.3		mg/kg	1.3	0.27	1	04/04/23 11:40	04/05/23 09:23	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	1.06	0.212	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Project Name: 2731 W 12TH ST

Lab Number: L2316548

Project Number: 170697301

Report Date: 04/12/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02,05 Batch: WG1762398-1										
Cyanide, Total	ND		mg/kg	0.95	0.20	1	04/04/23 11:40	04/05/23 08:30	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 06-08 Batch: WG1762401-1										
Cyanide, Total	ND		mg/kg	0.95	0.20	1	04/04/23 11:40	04/05/23 08:30	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 01-02,05-08 Batch: WG1762488-1										
Chromium, Hexavalent	ND		mg/kg	0.800	0.160	1	04/03/23 19:15	04/05/23 13:05	1,7196A	LOF



Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316548**Report Date:** 04/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02,05 Batch: WG1762398-2 WG1762398-3								
Cyanide, Total	100		87		80-120	14		35
General Chemistry - Westborough Lab Associated sample(s): 06-08 Batch: WG1762401-2 WG1762401-3								
Cyanide, Total	100		87		80-120	14		35
General Chemistry - Westborough Lab Associated sample(s): 01-02,05-08 Batch: WG1762488-2								
Chromium, Hexavalent	75	Q	-		80-120	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316548

Report Date: 04/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02,05 QC Batch ID: WG1762398-4 WG1762398-5 QC Sample: L2316429-01 Client ID: MS Sample												
Cyanide, Total	ND	12	12	100		12	100		75-125	0		35
General Chemistry - Westborough Lab Associated sample(s): 06-08 QC Batch ID: WG1762401-4 WG1762401-5 QC Sample: L2316548-07 Client ID: SB06_0-2												
Cyanide, Total	ND	10	10	100		10	101		75-125	1		35
General Chemistry - Westborough Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1762488-4 WG1762488-5 QC Sample: L2316548-07 Client ID: SB06_0-2												
Chromium, Hexavalent	ND	1580	1460	92		1210	95		75-125	3		20

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L2316548
Report Date: 04/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1760620-1 QC Sample: L2316548-07 Client ID: SB06_0-2						
Solids, Total	92.3	93.3	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 01-02,05-08 QC Batch ID: WG1762488-7 QC Sample: L2316548-07 Client ID: SB06_0-2						
Chromium, Hexavalent	ND	ND	mg/kg	NC		20

Project Name: 2731 W 12TH ST**Lab Number:** L2316548**Project Number:** 170697301**Report Date:** 04/12/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316548-01A	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-01B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-01C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-01D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),TL-TI(180),CR-TI(180),NI-TI(180),AL-TI(180),CU-TI(180),ZN-TI(180),SE-TI(180),SB-TI(180),PB-TI(180),CO-TI(180),V-TI(180),FE-TI(180),MG-TI(180),MN-TI(180),HG-T(28),CA-TI(180),NA-TI(180),K-TI(180),CD-TI(180)
L2316548-01E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-01F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316548-01G	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316548-02A	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-02B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-02C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-02D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),AL-TI(180),CU-TI(180),PB-TI(180),ZN-TI(180),SB-TI(180),SE-TI(180),CO-TI(180),V-TI(180),HG-T(28),MG-TI(180),FE-TI(180),MN-TI(180),K-TI(180),CA-TI(180),CD-TI(180),NA-TI(180)
L2316548-02E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-02F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316548-02G	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316548-03A	Vial MeOH preserved	A	NA		4.0	Y	Absent		HOLD-8260HLW(14)
L2316548-03B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	HOLD-8260HLW(14)
L2316548-03C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	HOLD-8260HLW(14)

Project Name: 2731 W 12TH ST
Project Number: 170697301

Serial_No:04122309:20
Lab Number: L2316548
Report Date: 04/12/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316548-03D	Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		HOLD-METAL(180)
L2316548-03E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		HOLD-WETCHEM()
L2316548-03F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		HOLD-8270(14)
L2316548-03G	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		HOLD-8270(14)
L2316548-04A	Vial MeOH preserved	A	NA		4.0	Y	Absent		HOLD-8260HLW(14)
L2316548-04B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	HOLD-8260HLW(14)
L2316548-04C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	HOLD-8260HLW(14)
L2316548-04D	Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		HOLD-METAL(180)
L2316548-04E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		HOLD-WETCHEM()
L2316548-04F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		HOLD-8270(14)
L2316548-04G	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		HOLD-8270(14)
L2316548-05A	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-05B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-05C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-05D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),NI-TI(180),AL-TI(180),TL-TI(180),SE-TI(180),ZN-TI(180),PB-TI(180),SB-TI(180),CU-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MG-TI(180),MN-TI(180),CA-TI(180),CD-TI(180),NA-TI(180),K-TI(180)
L2316548-05E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-05F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316548-05G	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316548-06A	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260H(14),NYTCL-8260HLW(14)
L2316548-06B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260H(14),NYTCL-8260HLW(14)
L2316548-06C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260H(14),NYTCL-8260HLW(14)
L2316548-06D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),TL-TI(180),NI-TI(180),AL-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),CU-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MN-TI(180),MG-TI(180),NA-TI(180),CA-TI(180),CD-TI(180),K-TI(180)
L2316548-06E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)

Project Name: 2731 W 12TH ST
Project Number: 170697301

Serial_No: 04122309:20
Lab Number: L2316548
Report Date: 04/12/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316548-06F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316548-06G	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316548-07A	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-07A1	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-07A2	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-07B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-07B1	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-07B2	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-07C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-07C1	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-07C2	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-07D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),NI-TI(180),CR-TI(180),TL-TI(180),AL-TI(180),PB-TI(180),SB-TI(180),CU-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MN-TI(180),MG-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L2316548-07D1	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),NI-TI(180),CR-TI(180),TL-TI(180),AL-TI(180),PB-TI(180),SB-TI(180),CU-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MN-TI(180),MG-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L2316548-07D2	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),NI-TI(180),CR-TI(180),TL-TI(180),AL-TI(180),PB-TI(180),SB-TI(180),CU-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),HG-T(28),FE-TI(180),MN-TI(180),MG-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L2316548-07E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-07E1	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-07E2	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-07F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)
L2316548-07F1	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316548-07F2	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)
L2316548-07G	Glass 500ml/16oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)
L2316548-07G1	Glass 500ml/16oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)
L2316548-07G2	Glass 500ml/16oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)
L2316548-08A	Vial MeOH preserved	A	NA		4.0	Y	Absent		NYTCL-8260HLW(14)
L2316548-08B	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-08C	Vial water preserved	A	NA		4.0	Y	Absent	30-MAR-23 06:03	NYTCL-8260HLW(14)
L2316548-08D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.0	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),NI-TI(180),TL-TI(180),CR-TI(180),AL-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),V-TI(180),CO-TI(180),HG-T(28),MN-TI(180),MG-TI(180),FE-TI(180),CD-TI(180),CA-TI(180),NA-TI(180),K-TI(180)
L2316548-08E	Plastic 120ml unpreserved	A	NA		4.0	Y	Absent		TS(7)
L2316548-08F	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)
L2316548-08G	Glass 500ml/16oz unpreserved	A	NA		4.0	Y	Absent		NYTCL-8270(14),TCN-9010(14),NYTCL-8082(365),HEXCR-7196(30)

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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

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REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 107 Alpha Analytical - In-house calculation method.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

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Certification Information**The following analytes are not included in our Primary NELAP Scope of Accreditation:****Westborough Facility****EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,


3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B**The following analytes are included in our Massachusetts DEP Scope of Accreditation****Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H-B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

 NEW YORK CHAIN OF CUSTODY		Service Centers Mahwah, NJ 07430: 35 Whitney Rd, Suite 5 Albany, NY 12205: 14 Walker Way Tonawanda, NY 14150: 275 Cooper Ave, Suite 105		Page 1 of 1		Date Rec'd in Lab 03/30/23		ALPHA Job # L2316548	
Westborough, MA 01581 8 Walkup Dr. TEL: 508-898-9220 FAX: 508-898-9193		Mansfield, MA 02048 320 Forbes Blvd TEL: 508-822-9300 FAX: 508-822-3288		Project Information Project Name: 2731 W 12th St Project Location: Brooklyn, NY Project # 170697301 (Use Project name as Project #) <input type="checkbox"/> Project Manager: Elizabeth Adkins ALPHAQuote #: Turn-Around Time Standard <input checked="" type="checkbox"/> Due Date: Rush (only if pre approved) <input type="checkbox"/> # of Days:		Deliverables <input type="checkbox"/> ASP-A <input checked="" type="checkbox"/> ASP-B <input type="checkbox"/> EQUIS (1 File) <input type="checkbox"/> EQUIS (4 File) <input type="checkbox"/> Other		Billing Information <input checked="" type="checkbox"/> Same as Client Info PO #	
Client Information Client: Langan Address: 360 W 31st St NY, NY, 10001 Phone: 212-479-5400 Fax: Email: eadkins@langan.com		Regulatory Requirement <input type="checkbox"/> NY TOGS <input checked="" type="checkbox"/> NY Part 375 <input type="checkbox"/> AWQ Standards <input type="checkbox"/> NY CP-51 <input type="checkbox"/> NY Restricted Use <input type="checkbox"/> Other <input type="checkbox"/> NY Unrestricted Use <input type="checkbox"/> NYC Sewer Discharge		Disposal Site Information Please identify below location of applicable disposal facilities. Disposal Facility: <input type="checkbox"/> NJ <input type="checkbox"/> NY <input type="checkbox"/> Other:		Other project specific requirements/comments: cc: datamanagement@langan.com & lgrosec@langan.com Please specify Metals or TAL.		Sample Filtration <input type="checkbox"/> Done <input type="checkbox"/> Lab to do <input type="checkbox"/> Lab to do (Please Specify below)	
These samples have been previously analyzed by Alpha <input type="checkbox"/>		ANALYSIS		Total Bottles		Sample Specific Comments		Total Bottles	
ALPHA Lab ID (Lab Use Only)		Sample ID		Collection Date Time		Sample Matrix		Sampler's Initials	
16548 -01 SB04-2-4 -02 SB04-13-15 -03 SB03-2-4 -04 SB03-14-16 -05 SB07-0-2 -06 SB07-5-6.5 -07 SB06-0-2 -08 SB06-12-14		032923 0940 032923 0950 1230 1305 1555 1605 1740 1800		S ↓ ↓ ↓ ↓ ↓ ↓ ↓		CQ ↓ ↓ ↓ ↓ ↓ ↓ ↓		part 315 TAL VCS part 315 TAL VCS part 315 TAL Metals total cyanide PCBs	
Preservative Code: A = None B = HCl C = HNO ₃ D = H ₂ SO ₄ E = NaOH F = MeOH G = NaHSO ₄ H = Na ₂ S ₂ O ₃ K/E = Zn Ac/NaOH O = Other		Container Code P = Plastic A = Amber Glass V = Vial G = Glass B = Bacteria Cup C = Cube O = Other E = Encore D = BOD Bottle		Westboro: Certification No: MA935 Mansfield: Certification No: MA015		Container Type		Preservative	
Relinquished By: Camille Quide (Langan) Date/Time: 3/29/23 18:22 Received By: G. JAC. (AAN) Date/Time: 3/29/23 18:22		Relinquished By: G. JAC. (AAN) Date/Time: 3/29/23 18:22 Received By: G. JAC. (AAN) Date/Time: 3/29/23 18:22		Relinquished By: G. JAC. (AAN) Date/Time: 3/29/23 18:22 Received By: G. JAC. (AAN) Date/Time: 3/29/23 18:22		Relinquished By: G. JAC. (AAN) Date/Time: 3/29/23 18:22 Received By: G. JAC. (AAN) Date/Time: 3/29/23 18:22		Relinquished By: G. JAC. (AAN) Date/Time: 3/29/23 18:22 Received By: G. JAC. (AAN) Date/Time: 3/29/23 18:22	
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Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)



ANALYTICAL REPORT

Lab Number:	L2316797
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Elizabeth Adkins
Phone:	(212) 479-5400
Project Name:	2731 W 12TH ST
Project Number:	170697301
Report Date:	04/06/23

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2316797-01	SB02_9.75-11	SOIL	BROOKLYN, NY	03/30/23 13:15	03/30/23
L2316797-02	SB03_A_2-4	SOIL	BROOKLYN, NY	03/30/23 16:43	03/30/23
L2316797-03	SB03_A_12-14	SOIL	BROOKLYN, NY	03/30/23 17:05	03/30/23

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2316797-02 and -03: The Client ID was specified by the client.

Volatile Organics

L2316797-01D and -01D2: The sample was received in the appropriate containers (vials) for the Volatile Organics by EPA Method 5035/8260 analysis; however, they could not be used for analysis. With the client's authorization, a sample aliquot was taken from an unpreserved container (jar) and preserved appropriately. Any reported concentrations that are below 200 ug/kg may be biased low due to the sample not being collected according to 5035-L/5035A-L low-level specifications.

L2316797-02: The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis. The results of both analyses are reported. Differences were noted between the results of the analyses which have been attributed to vial discrepancies.

Semivolatile Organics

L2316797-02D and -02RE\D: The sample has elevated detection limits due to the dilution required by the sample matrix.

L2316797-02D: The surrogate recoveries were outside the acceptance criteria for 2-fluorophenol (3%) and 2,4,6-tribromophenol (0%); however, re-extraction achieved similar results: 2-fluorophenol (0%) and 2,4,6-tribromophenol (0%). The results of both extractions are reported; however, all associated compounds are considered to have a potential bias.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Case Narrative (continued)

Total Metals

L2316797-01 through -03: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

The WG1761364-1 Method Blank, associated with L2316797-01 through -03, has a concentration above the reporting limit for iron. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

Cyanide, Total

The WG1762406-2 LCS recovery for cyanide, total (79%), associated with L2316797-01, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analysis are reported.

The WG1762751-2 LCS recovery for cyanide, total (71%), associated with L2316797-02 and -03, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

Hexavalent Chromium

The WG1762784-2 LCS recovery for chromium, hexavalent (79%), associated with L2316797-01 through -03, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

The WG1762784-4 Insoluble MS recovery for chromium, hexavalent (71%), performed on L2316797-01, is outside the acceptance criteria. The Soluble MS recovery for chromium, hexavalent (5%) was also outside criteria. This has been attributed to matrix interference. A post-spike was performed with a recovery of 85%.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Kelly O'Neill

Title: Technical Director/Representative

Date: 04/06/23

ORGANICS

VOLATILES

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-01 D2

Date Collected: 03/30/23 13:15

Client ID: SB02_9.75-11

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8260D

Analytical Date: 04/06/23 01:53

Analyst: JIC

Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	14000	6600	10
1,1-Dichloroethane	ND		ug/kg	2900	420	10
Chloroform	ND		ug/kg	4300	400	10
Carbon tetrachloride	ND		ug/kg	2900	660	10
1,2-Dichloropropane	ND		ug/kg	2900	360	10
Dibromochloromethane	ND		ug/kg	2900	400	10
1,1,2-Trichloroethane	ND		ug/kg	2900	770	10
Tetrachloroethene	ND		ug/kg	1400	560	10
Chlorobenzene	ND		ug/kg	1400	360	10
Trichlorofluoromethane	ND		ug/kg	11000	2000	10
1,2-Dichloroethane	ND		ug/kg	2900	740	10
1,1,1-Trichloroethane	ND		ug/kg	1400	480	10
Bromodichloromethane	ND		ug/kg	1400	310	10
trans-1,3-Dichloropropene	ND		ug/kg	2900	780	10
cis-1,3-Dichloropropene	ND		ug/kg	1400	450	10
1,3-Dichloropropene, Total	ND		ug/kg	1400	450	10
1,1-Dichloropropene	ND		ug/kg	1400	460	10
Bromoform	ND		ug/kg	11000	710	10
1,1,2,2-Tetrachloroethane	ND		ug/kg	1400	480	10
Benzene	1800		ug/kg	1400	480	10
Toluene	2800	J	ug/kg	2900	1600	10
Ethylbenzene	150000		ug/kg	2900	400	10
Chloromethane	ND		ug/kg	11000	2700	10
Bromomethane	ND		ug/kg	5700	1700	10
Vinyl chloride	ND		ug/kg	2900	960	10
Chloroethane	ND		ug/kg	5700	1300	10
1,1-Dichloroethene	ND		ug/kg	2900	680	10
trans-1,2-Dichloroethene	ND		ug/kg	4300	390	10

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-01 D2

Date Collected: 03/30/23 13:15

Client ID: SB02_9.75-11

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	1400	390	10
1,2-Dichlorobenzene	ND		ug/kg	5700	410	10
1,3-Dichlorobenzene	ND		ug/kg	5700	420	10
1,4-Dichlorobenzene	ND		ug/kg	5700	490	10
Methyl tert butyl ether	ND		ug/kg	5700	580	10
p/m-Xylene	130000		ug/kg	5700	1600	10
o-Xylene	53000		ug/kg	2900	840	10
Xylenes, Total	180000		ug/kg	2900	840	10
cis-1,2-Dichloroethene	ND		ug/kg	2900	500	10
1,2-Dichloroethene, Total	ND		ug/kg	2900	390	10
Dibromomethane	ND		ug/kg	5700	680	10
Styrene	850	J	ug/kg	2900	560	10
Dichlorodifluoromethane	ND		ug/kg	29000	2600	10
Acetone	ND		ug/kg	29000	14000	10
Carbon disulfide	ND		ug/kg	29000	13000	10
2-Butanone	ND		ug/kg	29000	6400	10
Vinyl acetate	ND		ug/kg	29000	6200	10
4-Methyl-2-pentanone	ND		ug/kg	29000	3700	10
1,2,3-Trichloropropane	ND		ug/kg	5700	360	10
2-Hexanone	ND		ug/kg	29000	3400	10
Bromochloromethane	ND		ug/kg	5700	590	10
2,2-Dichloropropane	ND		ug/kg	5700	580	10
1,2-Dibromoethane	ND		ug/kg	2900	800	10
1,3-Dichloropropane	ND		ug/kg	5700	480	10
1,1,1,2-Tetrachloroethane	ND		ug/kg	1400	380	10
Bromobenzene	ND		ug/kg	5700	420	10
n-Butylbenzene	ND		ug/kg	2900	480	10
sec-Butylbenzene	ND		ug/kg	2900	420	10
tert-Butylbenzene	ND		ug/kg	5700	340	10
o-Chlorotoluene	ND		ug/kg	5700	550	10
p-Chlorotoluene	ND		ug/kg	5700	310	10
1,2-Dibromo-3-chloropropane	ND		ug/kg	8600	2900	10
Hexachlorobutadiene	ND		ug/kg	11000	480	10
Isopropylbenzene	22000		ug/kg	2900	310	10
p-Isopropyltoluene	3300		ug/kg	2900	310	10
Naphthalene	1000000	E	ug/kg	11000	1900	10
Acrylonitrile	ND		ug/kg	11000	3300	10

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-01 D2

Date Collected: 03/30/23 13:15

Client ID: SB02_9.75-11

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	8000		ug/kg	2900	490	10
1,2,3-Trichlorobenzene	ND		ug/kg	5700	920	10
1,2,4-Trichlorobenzene	ND		ug/kg	5700	780	10
1,3,5-Trimethylbenzene	28000		ug/kg	5700	550	10
1,2,4-Trimethylbenzene	92000		ug/kg	5700	960	10
1,4-Dioxane	ND		ug/kg	230000	100000	10
p-Diethylbenzene	ND		ug/kg	5700	510	10
p-Ethyltoluene	150000		ug/kg	5700	1100	10
1,2,4,5-Tetramethylbenzene	6300		ug/kg	5700	550	10
Ethyl ether	ND		ug/kg	5700	980	10
trans-1,4-Dichloro-2-butene	ND		ug/kg	14000	4100	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-01 D
Client ID: SB02_9.75-11
Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 13:15
Date Received: 03/30/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 04/05/23 10:45
Analyst: AJK
Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Naphthalene	1300000		ug/kg	110000	19000	100
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02
 Client ID: SB03_A_2-4
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:43
 Analyst: JIC
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	7.9	3.6	1
1,1-Dichloroethane	ND		ug/kg	1.6	0.23	1
Chloroform	ND		ug/kg	2.4	0.22	1
Carbon tetrachloride	ND		ug/kg	1.6	0.36	1
1,2-Dichloropropane	ND		ug/kg	1.6	0.20	1
Dibromochloromethane	ND		ug/kg	1.6	0.22	1
1,1,2-Trichloroethane	ND		ug/kg	1.6	0.42	1
Tetrachloroethene	0.56	J	ug/kg	0.79	0.31	1
Chlorobenzene	0.31	J	ug/kg	0.79	0.20	1
Trichlorofluoromethane	ND		ug/kg	6.3	1.1	1
1,2-Dichloroethane	ND		ug/kg	1.6	0.41	1
1,1,1-Trichloroethane	ND		ug/kg	0.79	0.26	1
Bromodichloromethane	ND		ug/kg	0.79	0.17	1
trans-1,3-Dichloropropene	ND		ug/kg	1.6	0.43	1
cis-1,3-Dichloropropene	ND		ug/kg	0.79	0.25	1
1,3-Dichloropropene, Total	ND		ug/kg	0.79	0.25	1
1,1-Dichloropropene	ND		ug/kg	0.79	0.25	1
Bromoform	ND		ug/kg	6.3	0.39	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.79	0.26	1
Benzene	4.0		ug/kg	0.79	0.26	1
Toluene	9.6		ug/kg	1.6	0.86	1
Ethylbenzene	43		ug/kg	1.6	0.22	1
Chloromethane	ND		ug/kg	6.3	1.5	1
Bromomethane	ND		ug/kg	3.2	0.92	1
Vinyl chloride	ND		ug/kg	1.6	0.53	1
Chloroethane	ND		ug/kg	3.2	0.72	1
1,1-Dichloroethene	ND		ug/kg	1.6	0.38	1
trans-1,2-Dichloroethene	ND		ug/kg	2.4	0.22	1

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-02
 Client ID: SB03_A_2-4
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.79	0.22	1
1,2-Dichlorobenzene	1.6	J	ug/kg	3.2	0.23	1
1,3-Dichlorobenzene	0.50	J	ug/kg	3.2	0.23	1
1,4-Dichlorobenzene	1.5	J	ug/kg	3.2	0.27	1
Methyl tert butyl ether	ND		ug/kg	3.2	0.32	1
p/m-Xylene	40		ug/kg	3.2	0.89	1
o-Xylene	35		ug/kg	1.6	0.46	1
Xylenes, Total	75		ug/kg	1.6	0.46	1
cis-1,2-Dichloroethene	ND		ug/kg	1.6	0.28	1
1,2-Dichloroethene, Total	ND		ug/kg	1.6	0.22	1
Dibromomethane	ND		ug/kg	3.2	0.38	1
Styrene	8.6		ug/kg	1.6	0.31	1
Dichlorodifluoromethane	ND		ug/kg	16	1.4	1
Acetone	160		ug/kg	16	7.6	1
Carbon disulfide	ND		ug/kg	16	7.2	1
2-Butanone	24		ug/kg	16	3.5	1
Vinyl acetate	ND		ug/kg	16	3.4	1
4-Methyl-2-pentanone	2.8	J	ug/kg	16	2.0	1
1,2,3-Trichloropropane	ND		ug/kg	3.2	0.20	1
2-Hexanone	ND		ug/kg	16	1.9	1
Bromochloromethane	ND		ug/kg	3.2	0.32	1
2,2-Dichloropropane	ND		ug/kg	3.2	0.32	1
1,2-Dibromoethane	ND		ug/kg	1.6	0.44	1
1,3-Dichloropropane	ND		ug/kg	3.2	0.26	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.79	0.21	1
Bromobenzene	ND		ug/kg	3.2	0.23	1
n-Butylbenzene	2.1		ug/kg	1.6	0.26	1
sec-Butylbenzene	1.8		ug/kg	1.6	0.23	1
tert-Butylbenzene	0.33	J	ug/kg	3.2	0.19	1
o-Chlorotoluene	ND		ug/kg	3.2	0.30	1
p-Chlorotoluene	ND		ug/kg	3.2	0.17	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.7	1.6	1
Hexachlorobutadiene	ND		ug/kg	6.3	0.27	1
Isopropylbenzene	20		ug/kg	1.6	0.17	1
p-Isopropyltoluene	78		ug/kg	1.6	0.17	1
Naphthalene	800	E	ug/kg	6.3	1.0	1
Acrylonitrile	ND		ug/kg	6.3	1.8	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-02
Client ID: SB03_A_2-4
Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43
Date Received: 03/30/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	7.5		ug/kg	1.6	0.27	1
1,2,3-Trichlorobenzene	ND		ug/kg	3.2	0.51	1
1,2,4-Trichlorobenzene	0.63	J	ug/kg	3.2	0.43	1
1,3,5-Trimethylbenzene	24		ug/kg	3.2	0.30	1
1,2,4-Trimethylbenzene	80		ug/kg	3.2	0.53	1
1,4-Dioxane	ND		ug/kg	130	56.	1
p-Diethylbenzene	17		ug/kg	3.2	0.28	1
p-Ethyltoluene	44		ug/kg	3.2	0.61	1
1,2,4,5-Tetramethylbenzene	18		ug/kg	3.2	0.30	1
Ethyl ether	ND		ug/kg	3.2	0.54	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	7.9	2.2	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	117		70-130
Dibromofluoromethane	87		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02
 Client ID: SB03_A_2-4
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/05/23 09:26
 Analyst: AJK
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	610	280	1
1,1-Dichloroethane	ND		ug/kg	120	18.	1
Chloroform	ND		ug/kg	180	17.	1
Carbon tetrachloride	ND		ug/kg	120	28.	1
1,2-Dichloropropane	ND		ug/kg	120	15.	1
Dibromochloromethane	ND		ug/kg	120	17.	1
1,1,2-Trichloroethane	ND		ug/kg	120	33.	1
Tetrachloroethene	ND		ug/kg	61	24.	1
Chlorobenzene	ND		ug/kg	61	16.	1
Trichlorofluoromethane	ND		ug/kg	490	85.	1
1,2-Dichloroethane	ND		ug/kg	120	32.	1
1,1,1-Trichloroethane	ND		ug/kg	61	20.	1
Bromodichloromethane	ND		ug/kg	61	13.	1
trans-1,3-Dichloropropene	ND		ug/kg	120	34.	1
cis-1,3-Dichloropropene	ND		ug/kg	61	19.	1
1,3-Dichloropropene, Total	ND		ug/kg	61	19.	1
1,1-Dichloropropene	ND		ug/kg	61	20.	1
Bromoform	ND		ug/kg	490	30.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	61	20.	1
Benzene	140		ug/kg	61	20.	1
Toluene	98	J	ug/kg	120	67.	1
Ethylbenzene	260		ug/kg	120	17.	1
Chloromethane	ND		ug/kg	490	110	1
Bromomethane	ND		ug/kg	240	71.	1
Vinyl chloride	ND		ug/kg	120	41.	1
Chloroethane	ND		ug/kg	240	56.	1
1,1-Dichloroethene	ND		ug/kg	120	29.	1
trans-1,2-Dichloroethene	ND		ug/kg	180	17.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02
 Client ID: SB03_A_2-4
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	61	17.	1
1,2-Dichlorobenzene	ND		ug/kg	240	18.	1
1,3-Dichlorobenzene	ND		ug/kg	240	18.	1
1,4-Dichlorobenzene	24	J	ug/kg	240	21.	1
Methyl tert butyl ether	ND		ug/kg	240	25.	1
p/m-Xylene	200	J	ug/kg	240	69.	1
o-Xylene	140		ug/kg	120	36.	1
Xylenes, Total	340	J	ug/kg	120	36.	1
cis-1,2-Dichloroethene	ND		ug/kg	120	22.	1
1,2-Dichloroethene, Total	ND		ug/kg	120	17.	1
Dibromomethane	ND		ug/kg	240	29.	1
Styrene	74	J	ug/kg	120	24.	1
Dichlorodifluoromethane	ND		ug/kg	1200	110	1
Acetone	810	J	ug/kg	1200	590	1
Carbon disulfide	ND		ug/kg	1200	560	1
2-Butanone	310	J	ug/kg	1200	270	1
Vinyl acetate	ND		ug/kg	1200	260	1
4-Methyl-2-pentanone	ND		ug/kg	1200	160	1
1,2,3-Trichloropropane	ND		ug/kg	240	16.	1
2-Hexanone	ND		ug/kg	1200	140	1
Bromochloromethane	ND		ug/kg	240	25.	1
2,2-Dichloropropane	ND		ug/kg	240	25.	1
1,2-Dibromoethane	ND		ug/kg	120	34.	1
1,3-Dichloropropane	ND		ug/kg	240	20.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	61	16.	1
Bromobenzene	ND		ug/kg	240	18.	1
n-Butylbenzene	24	J	ug/kg	120	20.	1
sec-Butylbenzene	ND		ug/kg	120	18.	1
tert-Butylbenzene	ND		ug/kg	240	14.	1
o-Chlorotoluene	ND		ug/kg	240	23.	1
p-Chlorotoluene	ND		ug/kg	240	13.	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	370	120	1
Hexachlorobutadiene	ND		ug/kg	490	21.	1
Isopropylbenzene	70	J	ug/kg	120	13.	1
p-Isopropyltoluene	390		ug/kg	120	13.	1
Naphthalene	5700		ug/kg	490	80.	1
Acrylonitrile	ND		ug/kg	490	140	1

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-02

Date Collected: 03/30/23 16:43

Client ID: SB03_A_2-4

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	39	J	ug/kg	120	21.	1
1,2,3-Trichlorobenzene	ND		ug/kg	240	40.	1
1,2,4-Trichlorobenzene	ND		ug/kg	240	33.	1
1,3,5-Trimethylbenzene	89	J	ug/kg	240	24.	1
1,2,4-Trimethylbenzene	300		ug/kg	240	41.	1
1,4-Dioxane	ND		ug/kg	9800	4300	1
p-Diethylbenzene	100	J	ug/kg	240	22.	1
p-Ethyltoluene	190	J	ug/kg	240	47.	1
1,2,4,5-Tetramethylbenzene	120	J	ug/kg	240	23.	1
Ethyl ether	ND		ug/kg	240	42.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	610	170	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-03
 Client ID: SB03_A_12-14
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/03/23 13:22
 Analyst: AJK
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	6.4	2.9	1
1,1-Dichloroethane	ND		ug/kg	1.3	0.18	1
Chloroform	ND		ug/kg	1.9	0.18	1
Carbon tetrachloride	ND		ug/kg	1.3	0.29	1
1,2-Dichloropropane	ND		ug/kg	1.3	0.16	1
Dibromochloromethane	ND		ug/kg	1.3	0.18	1
1,1,2-Trichloroethane	ND		ug/kg	1.3	0.34	1
Tetrachloroethene	ND		ug/kg	0.64	0.25	1
Chlorobenzene	ND		ug/kg	0.64	0.16	1
Trichlorofluoromethane	ND		ug/kg	5.1	0.89	1
1,2-Dichloroethane	ND		ug/kg	1.3	0.33	1
1,1,1-Trichloroethane	ND		ug/kg	0.64	0.21	1
Bromodichloromethane	ND		ug/kg	0.64	0.14	1
trans-1,3-Dichloropropene	ND		ug/kg	1.3	0.35	1
cis-1,3-Dichloropropene	ND		ug/kg	0.64	0.20	1
1,3-Dichloropropene, Total	ND		ug/kg	0.64	0.20	1
1,1-Dichloropropene	ND		ug/kg	0.64	0.20	1
Bromoform	ND		ug/kg	5.1	0.32	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.64	0.21	1
Benzene	18		ug/kg	0.64	0.21	1
Toluene	0.89	J	ug/kg	1.3	0.70	1
Ethylbenzene	0.66	J	ug/kg	1.3	0.18	1
Chloromethane	ND		ug/kg	5.1	1.2	1
Bromomethane	ND		ug/kg	2.6	0.74	1
Vinyl chloride	ND		ug/kg	1.3	0.43	1
Chloroethane	ND		ug/kg	2.6	0.58	1
1,1-Dichloroethene	ND		ug/kg	1.3	0.30	1
trans-1,2-Dichloroethene	ND		ug/kg	1.9	0.18	1

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-03
 Client ID: SB03_A_12-14
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.64	0.18	1
1,2-Dichlorobenzene	ND		ug/kg	2.6	0.18	1
1,3-Dichlorobenzene	ND		ug/kg	2.6	0.19	1
1,4-Dichlorobenzene	ND		ug/kg	2.6	0.22	1
Methyl tert butyl ether	ND		ug/kg	2.6	0.26	1
p/m-Xylene	2.8		ug/kg	2.6	0.72	1
o-Xylene	1.2	J	ug/kg	1.3	0.37	1
Xylenes, Total	4.0	J	ug/kg	1.3	0.37	1
cis-1,2-Dichloroethene	ND		ug/kg	1.3	0.22	1
1,2-Dichloroethene, Total	ND		ug/kg	1.3	0.18	1
Dibromomethane	ND		ug/kg	2.6	0.30	1
Styrene	ND		ug/kg	1.3	0.25	1
Dichlorodifluoromethane	ND		ug/kg	13	1.2	1
Acetone	23		ug/kg	13	6.2	1
Carbon disulfide	12	J	ug/kg	13	5.8	1
2-Butanone	ND		ug/kg	13	2.8	1
Vinyl acetate	ND		ug/kg	13	2.8	1
4-Methyl-2-pentanone	ND		ug/kg	13	1.6	1
1,2,3-Trichloropropane	ND		ug/kg	2.6	0.16	1
2-Hexanone	ND		ug/kg	13	1.5	1
Bromochloromethane	ND		ug/kg	2.6	0.26	1
2,2-Dichloropropane	ND		ug/kg	2.6	0.26	1
1,2-Dibromoethane	ND		ug/kg	1.3	0.36	1
1,3-Dichloropropane	ND		ug/kg	2.6	0.21	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.64	0.17	1
Bromobenzene	ND		ug/kg	2.6	0.18	1
n-Butylbenzene	1.8		ug/kg	1.3	0.21	1
sec-Butylbenzene	1.3		ug/kg	1.3	0.19	1
tert-Butylbenzene	0.23	J	ug/kg	2.6	0.15	1
o-Chlorotoluene	ND		ug/kg	2.6	0.24	1
p-Chlorotoluene	ND		ug/kg	2.6	0.14	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.8	1.3	1
Hexachlorobutadiene	ND		ug/kg	5.1	0.22	1
Isopropylbenzene	41		ug/kg	1.3	0.14	1
p-Isopropyltoluene	0.30	J	ug/kg	1.3	0.14	1
Naphthalene	14		ug/kg	5.1	0.83	1
Acrylonitrile	ND		ug/kg	5.1	1.5	1

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-03
Client ID: SB03_A_12-14
Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05
Date Received: 03/30/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	9.7		ug/kg	1.3	0.22	1
1,2,3-Trichlorobenzene	ND		ug/kg	2.6	0.41	1
1,2,4-Trichlorobenzene	ND		ug/kg	2.6	0.35	1
1,3,5-Trimethylbenzene	1.2	J	ug/kg	2.6	0.25	1
1,2,4-Trimethylbenzene	2.8		ug/kg	2.6	0.43	1
1,4-Dioxane	ND		ug/kg	100	45.	1
p-Diethylbenzene	5.1		ug/kg	2.6	0.23	1
p-Ethyltoluene	2.3	J	ug/kg	2.6	0.49	1
1,2,4,5-Tetramethylbenzene	27		ug/kg	2.6	0.24	1
Ethyl ether	ND		ug/kg	2.6	0.44	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	6.4	1.8	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	111		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:12
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1762473-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	0.23	J	ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	ND		ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 11:12
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1762473-5					
1,2-Dichlorobenzene	0.30	J	ug/kg	2.0	0.14
1,3-Dichlorobenzene	0.34	J	ug/kg	2.0	0.15
1,4-Dichlorobenzene	0.40	J	ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	0.44	J	ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	0.16	J	ug/kg	2.0	0.14
n-Butylbenzene	0.40	J	ug/kg	1.0	0.17
sec-Butylbenzene	0.25	J	ug/kg	1.0	0.15
tert-Butylbenzene	0.15	J	ug/kg	2.0	0.12
o-Chlorotoluene	0.21	J	ug/kg	2.0	0.19

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/03/23 11:12
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1762473-5					
p-Chlorotoluene	0.23	J	ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	0.35	J	ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	0.28	J	ug/kg	1.0	0.11
Naphthalene	1.6	J	ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	0.19	J	ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	1.2	J	ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	0.96	J	ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	0.35	J	ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	0.51	J	ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	113		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02 Batch: WG1762962-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	ND		ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02 Batch: WG1762962-5					
1,2-Dichlorobenzene	ND		ug/kg	2.0	0.14
1,3-Dichlorobenzene	ND		ug/kg	2.0	0.15
1,4-Dichlorobenzene	ND		ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	ND		ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	ND		ug/kg	2.0	0.14
n-Butylbenzene	ND		ug/kg	1.0	0.17
sec-Butylbenzene	ND		ug/kg	1.0	0.15
tert-Butylbenzene	ND		ug/kg	2.0	0.12
o-Chlorotoluene	ND		ug/kg	2.0	0.19

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/04/23 18:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02 Batch: WG1762962-5					
p-Chlorotoluene	ND		ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	ND		ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	ND		ug/kg	1.0	0.11
Naphthalene	ND		ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	ND		ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	ND		ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	ND		ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	ND		ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	93		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02 Batch: WG1763068-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02 Batch: WG1763068-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02 Batch: WG1763068-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	ND		ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	106		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 18:41
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG1763422-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	7.6	J	ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 18:41
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG1763422-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	17	J	ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 18:41
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG1763422-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	160	J	ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	106		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1762473-3 WG1762473-4								
Methylene chloride	87		85		70-130	2		30
1,1-Dichloroethane	87		84		70-130	4		30
Chloroform	87		84		70-130	4		30
Carbon tetrachloride	104		100		70-130	4		30
1,2-Dichloropropane	78		88		70-130	12		30
Dibromochloromethane	83		96		70-130	15		30
1,1,2-Trichloroethane	81		85		70-130	5		30
Tetrachloroethene	92		94		70-130	2		30
Chlorobenzene	88		94		70-130	7		30
Trichlorofluoromethane	84		90		70-139	7		30
1,2-Dichloroethane	84		85		70-130	1		30
1,1,1-Trichloroethane	99		98		70-130	1		30
Bromodichloromethane	74		88		70-130	17		30
trans-1,3-Dichloropropene	83		83		70-130	0		30
cis-1,3-Dichloropropene	82		70		70-130	16		30
1,1-Dichloropropene	92		94		70-130	2		30
Bromoform	89		93		70-130	4		30
1,1,2,2-Tetrachloroethane	74		87		70-130	16		30
Benzene	91		93		70-130	2		30
Toluene	91		92		70-130	1		30
Ethylbenzene	88		94		70-130	7		30
Chloromethane	71		70		52-130	1		30
Bromomethane	88		88		57-147	0		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1762473-3 WG1762473-4								
Vinyl chloride	77		76		67-130	1		30
Chloroethane	89		88		50-151	1		30
1,1-Dichloroethene	91		88		65-135	3		30
trans-1,2-Dichloroethene	92		90		70-130	2		30
Trichloroethene	105		103		70-130	2		30
1,2-Dichlorobenzene	98		98		70-130	0		30
1,3-Dichlorobenzene	100		98		70-130	2		30
1,4-Dichlorobenzene	92		95		70-130	3		30
Methyl tert butyl ether	95		89		66-130	7		30
p/m-Xylene	95		94		70-130	1		30
o-Xylene	81		79		70-130	3		30
cis-1,2-Dichloroethene	89		91		70-130	2		30
Dibromomethane	80		88		70-130	10		30
Styrene	87		81		70-130	7		30
Dichlorodifluoromethane	76		75		30-146	1		30
Acetone	100		96		54-140	4		30
Carbon disulfide	141	Q	139	Q	59-130	1		30
2-Butanone	98		96		70-130	2		30
Vinyl acetate	89		91		70-130	2		30
4-Methyl-2-pentanone	85		89		70-130	5		30
1,2,3-Trichloropropane	77		88		68-130	13		30
2-Hexanone	89		93		70-130	4		30
Bromochloromethane	92		91		70-130	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1762473-3 WG1762473-4								
2,2-Dichloropropane	91		92		70-130	1		30
1,2-Dibromoethane	86		82		70-130	5		30
1,3-Dichloropropane	73		75		69-130	3		30
1,1,1,2-Tetrachloroethane	100		88		70-130	13		30
Bromobenzene	101		97		70-130	4		30
n-Butylbenzene	101		102		70-130	1		30
sec-Butylbenzene	96		101		70-130	5		30
tert-Butylbenzene	107		104		70-130	3		30
o-Chlorotoluene	87		98		70-130	12		30
p-Chlorotoluene	89		99		70-130	11		30
1,2-Dibromo-3-chloropropane	94		116		68-130	21		30
Hexachlorobutadiene	84		116		67-130	32	Q	30
Isopropylbenzene	103		99		70-130	4		30
p-Isopropyltoluene	107		106		70-130	1		30
Naphthalene	99		122		70-130	21		30
Acrylonitrile	96		94		70-130	2		30
n-Propylbenzene	104		98		70-130	6		30
1,2,3-Trichlorobenzene	97		118		70-130	20		30
1,2,4-Trichlorobenzene	84		120		70-130	35	Q	30
1,3,5-Trimethylbenzene	86		98		70-130	13		30
1,2,4-Trimethylbenzene	100		98		70-130	2		30
1,4-Dioxane	72		97		65-136	30		30
p-Diethylbenzene	104		105		70-130	1		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1762473-3 WG1762473-4								
p-Ethyltoluene	86		100		70-130	15		30
1,2,4,5-Tetramethylbenzene	98		124		70-130	23		30
Ethyl ether	88		86		67-130	2		30
trans-1,4-Dichloro-2-butene	88		93		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	88		91		70-130
Toluene-d8	93		96		70-130
4-Bromofluorobenzene	97		95		70-130
Dibromofluoromethane	90		90		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02 Batch: WG1762962-3 WG1762962-4								
Methylene chloride	96		88		70-130	9		30
1,1-Dichloroethane	104		93		70-130	11		30
Chloroform	104		94		70-130	10		30
Carbon tetrachloride	103		89		70-130	15		30
1,2-Dichloropropane	103		94		70-130	9		30
Dibromochloromethane	97		91		70-130	6		30
1,1,2-Trichloroethane	91		87		70-130	4		30
Tetrachloroethene	106		89		70-130	17		30
Chlorobenzene	98		88		70-130	11		30
Trichlorofluoromethane	117		100		70-139	16		30
1,2-Dichloroethane	103		98		70-130	5		30
1,1,1-Trichloroethane	111		97		70-130	13		30
Bromodichloromethane	106		98		70-130	8		30
trans-1,3-Dichloropropene	93		87		70-130	7		30
cis-1,3-Dichloropropene	107		100		70-130	7		30
1,1-Dichloropropene	108		94		70-130	14		30
Bromoform	88		86		70-130	2		30
1,1,1,2-Tetrachloroethane	83		81		70-130	2		30
Benzene	106		95		70-130	11		30
Toluene	92		81		70-130	13		30
Ethylbenzene	95		84		70-130	12		30
Chloromethane	116		99		52-130	16		30
Bromomethane	107		94		57-147	13		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02 Batch: WG1762962-3 WG1762962-4								
Vinyl chloride	114		96		67-130	17		30
Chloroethane	108		93		50-151	15		30
1,1-Dichloroethene	108		94		65-135	14		30
trans-1,2-Dichloroethene	109		95		70-130	14		30
Trichloroethene	108		94		70-130	14		30
1,2-Dichlorobenzene	95		89		70-130	7		30
1,3-Dichlorobenzene	95		87		70-130	9		30
1,4-Dichlorobenzene	94		86		70-130	9		30
Methyl tert butyl ether	108		104		66-130	4		30
p/m-Xylene	98		87		70-130	12		30
o-Xylene	100		89		70-130	12		30
cis-1,2-Dichloroethene	106		98		70-130	8		30
Dibromomethane	105		101		70-130	4		30
Styrene	98		89		70-130	10		30
Dichlorodifluoromethane	115		97		30-146	17		30
Acetone	106		109		54-140	3		30
Carbon disulfide	116		100		59-130	15		30
2-Butanone	79		86		70-130	8		30
Vinyl acetate	95		92		70-130	3		30
4-Methyl-2-pentanone	77		79		70-130	3		30
1,2,3-Trichloropropane	83		81		68-130	2		30
2-Hexanone	78		77		70-130	1		30
Bromochloromethane	111		108		70-130	3		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02 Batch: WG1762962-3 WG1762962-4								
2,2-Dichloropropane	104		90		70-130	14		30
1,2-Dibromoethane	96		92		70-130	4		30
1,3-Dichloropropane	92		87		69-130	6		30
1,1,1,2-Tetrachloroethane	101		92		70-130	9		30
Bromobenzene	95		87		70-130	9		30
n-Butylbenzene	92		81		70-130	13		30
sec-Butylbenzene	92		80		70-130	14		30
tert-Butylbenzene	92		81		70-130	13		30
o-Chlorotoluene	91		80		70-130	13		30
p-Chlorotoluene	90		80		70-130	12		30
1,2-Dibromo-3-chloropropane	77		79		68-130	3		30
Hexachlorobutadiene	95		87		67-130	9		30
Isopropylbenzene	92		79		70-130	15		30
p-Isopropyltoluene	95		83		70-130	13		30
Naphthalene	84		86		70-130	2		30
Acrylonitrile	79		82		70-130	4		30
n-Propylbenzene	92		80		70-130	14		30
1,2,3-Trichlorobenzene	94		94		70-130	0		30
1,2,4-Trichlorobenzene	99		95		70-130	4		30
1,3,5-Trimethylbenzene	94		82		70-130	14		30
1,2,4-Trimethylbenzene	92		83		70-130	10		30
1,4-Dioxane	76		85		65-136	11		30
p-Diethylbenzene	95		84		70-130	12		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02 Batch: WG1762962-3 WG1762962-4								
p-Ethyltoluene	94		83		70-130	12		30
1,2,4,5-Tetramethylbenzene	96		89		70-130	8		30
Ethyl ether	107		102		67-130	5		30
trans-1,4-Dichloro-2-butene	76		74		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		105		70-130
Toluene-d8	94		93		70-130
4-Bromofluorobenzene	93		92		70-130
Dibromofluoromethane	107		109		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
Methylene chloride	95		94		70-130	1		30
1,1-Dichloroethane	103		101		70-130	2		30
Chloroform	107		106		70-130	1		30
Carbon tetrachloride	103		101		70-130	2		30
1,2-Dichloropropane	102		102		70-130	0		30
Dibromochloromethane	96		94		70-130	2		30
1,1,2-Trichloroethane	91		90		70-130	1		30
Tetrachloroethene	102		97		70-130	5		30
Chlorobenzene	97		94		70-130	3		30
Trichlorofluoromethane	115		110		70-139	4		30
1,2-Dichloroethane	103		104		70-130	1		30
1,1,1-Trichloroethane	110		108		70-130	2		30
Bromodichloromethane	105		106		70-130	1		30
trans-1,3-Dichloropropene	92		90		70-130	2		30
cis-1,3-Dichloropropene	106		108		70-130	2		30
1,1-Dichloropropene	106		104		70-130	2		30
Bromoform	88		86		70-130	2		30
1,1,2,2-Tetrachloroethane	84		82		70-130	2		30
Benzene	106		104		70-130	2		30
Toluene	91		87		70-130	4		30
Ethylbenzene	92		88		70-130	4		30
Chloromethane	113		109		52-130	4		30
Bromomethane	107		102		57-147	5		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
Vinyl chloride	112		106		67-130	6		30
Chloroethane	108		104		50-151	4		30
1,1-Dichloroethene	110		105		65-135	5		30
trans-1,2-Dichloroethene	110		108		70-130	2		30
Trichloroethene	107		104		70-130	3		30
1,2-Dichlorobenzene	95		89		70-130	7		30
1,3-Dichlorobenzene	95		89		70-130	7		30
1,4-Dichlorobenzene	95		90		70-130	5		30
Methyl tert butyl ether	108		110		66-130	2		30
p/m-Xylene	97		93		70-130	4		30
o-Xylene	98		94		70-130	4		30
cis-1,2-Dichloroethene	105		105		70-130	0		30
Dibromomethane	104		106		70-130	2		30
Styrene	96		94		70-130	2		30
Dichlorodifluoromethane	115		108		30-146	6		30
Acetone	96		104		54-140	8		30
Carbon disulfide	116		111		59-130	4		30
2-Butanone	78		81		70-130	4		30
Vinyl acetate	92		98		70-130	6		30
4-Methyl-2-pentanone	77		79		70-130	3		30
1,2,3-Trichloropropane	83		80		68-130	4		30
2-Hexanone	72		74		70-130	3		30
Bromochloromethane	114		116		70-130	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
2,2-Dichloropropane	103		101		70-130	2		30
1,2-Dibromoethane	95		94		70-130	1		30
1,3-Dichloropropane	91		90		69-130	1		30
1,1,1,2-Tetrachloroethane	101		98		70-130	3		30
Bromobenzene	94		90		70-130	4		30
n-Butylbenzene	90		85		70-130	6		30
sec-Butylbenzene	92		85		70-130	8		30
tert-Butylbenzene	92		85		70-130	8		30
o-Chlorotoluene	109		92		70-130	17		30
p-Chlorotoluene	90		83		70-130	8		30
1,2-Dibromo-3-chloropropane	76		79		68-130	4		30
Hexachlorobutadiene	94		91		67-130	3		30
Isopropylbenzene	92		83		70-130	10		30
p-Isopropyltoluene	94		88		70-130	7		30
Naphthalene	83		85		70-130	2		30
Acrylonitrile	78		82		70-130	5		30
n-Propylbenzene	91		84		70-130	8		30
1,2,3-Trichlorobenzene	94		95		70-130	1		30
1,2,4-Trichlorobenzene	97		96		70-130	1		30
1,3,5-Trimethylbenzene	93		86		70-130	8		30
1,2,4-Trimethylbenzene	93		87		70-130	7		30
1,4-Dioxane	77		82		65-136	6		30
p-Diethylbenzene	94		88		70-130	7		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
p-Ethyltoluene	94		87		70-130	8		30
1,2,4,5-Tetramethylbenzene	94		92		70-130	2		30
Ethyl ether	104		109		67-130	5		30
trans-1,4-Dichloro-2-butene	82		74		70-130	10		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	100		104		70-130
Toluene-d8	94		91		70-130
4-Bromofluorobenzene	94		90		70-130
Dibromofluoromethane	108		109		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG1763422-3 WG1763422-4								
Methylene chloride	92		98		70-130	6		30
1,1-Dichloroethane	99		105		70-130	6		30
Chloroform	104		108		70-130	4		30
Carbon tetrachloride	98		104		70-130	6		30
1,2-Dichloropropane	101		106		70-130	5		30
Dibromochloromethane	91		96		70-130	5		30
1,1,2-Trichloroethane	88		92		70-130	4		30
Tetrachloroethene	97		101		70-130	4		30
Chlorobenzene	92		97		70-130	5		30
Trichlorofluoromethane	109		117		70-139	7		30
1,2-Dichloroethane	102		109		70-130	7		30
1,1,1-Trichloroethane	106		112		70-130	6		30
Bromodichloromethane	102		108		70-130	6		30
trans-1,3-Dichloropropene	88		93		70-130	6		30
cis-1,3-Dichloropropene	105		112		70-130	6		30
1,1-Dichloropropene	102		109		70-130	7		30
Bromoform	82		85		70-130	4		30
1,1,2,2-Tetrachloroethane	77		81		70-130	5		30
Benzene	102		110		70-130	8		30
Toluene	86		90		70-130	5		30
Ethylbenzene	88		93		70-130	6		30
Chloromethane	109		116		52-130	6		30
Bromomethane	104		111		57-147	7		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG1763422-3 WG1763422-4								
Vinyl chloride	106		114		67-130	7		30
Chloroethane	102		109		50-151	7		30
1,1-Dichloroethene	103		110		65-135	7		30
trans-1,2-Dichloroethene	105		109		70-130	4		30
Trichloroethene	102		110		70-130	8		30
1,2-Dichlorobenzene	90		93		70-130	3		30
1,3-Dichlorobenzene	88		92		70-130	4		30
1,4-Dichlorobenzene	88		92		70-130	4		30
Methyl tert butyl ether	106		114		66-130	7		30
p/m-Xylene	93		97		70-130	4		30
o-Xylene	94		98		70-130	4		30
cis-1,2-Dichloroethene	104		110		70-130	6		30
Dibromomethane	104		110		70-130	6		30
Styrene	93		97		70-130	4		30
Dichlorodifluoromethane	106		113		30-146	6		30
Acetone	106		111		54-140	5		30
Carbon disulfide	109		115		59-130	5		30
2-Butanone	78		88		70-130	12		30
Vinyl acetate	92		93		70-130	1		30
4-Methyl-2-pentanone	74		77		70-130	4		30
1,2,3-Trichloropropane	75		80		68-130	6		30
2-Hexanone	70		74		70-130	6		30
Bromochloromethane	113		120		70-130	6		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG1763422-3 WG1763422-4								
2,2-Dichloropropane	100		105		70-130	5		30
1,2-Dibromoethane	92		96		70-130	4		30
1,3-Dichloropropane	88		92		69-130	4		30
1,1,1,2-Tetrachloroethane	94		101		70-130	7		30
Bromobenzene	88		93		70-130	6		30
n-Butylbenzene	85		88		70-130	3		30
sec-Butylbenzene	84		87		70-130	4		30
tert-Butylbenzene	84		88		70-130	5		30
o-Chlorotoluene	82		86		70-130	5		30
p-Chlorotoluene	83		86		70-130	4		30
1,2-Dibromo-3-chloropropane	71		76		68-130	7		30
Hexachlorobutadiene	92		92		67-130	0		30
Isopropylbenzene	83		87		70-130	5		30
p-Isopropyltoluene	87		90		70-130	3		30
Naphthalene	92		93		70-130	1		30
Acrylonitrile	77		83		70-130	8		30
n-Propylbenzene	83		87		70-130	5		30
1,2,3-Trichlorobenzene	93		94		70-130	1		30
1,2,4-Trichlorobenzene	96		96		70-130	0		30
1,3,5-Trimethylbenzene	86		89		70-130	3		30
1,2,4-Trimethylbenzene	86		90		70-130	5		30
1,4-Dioxane	76		81		65-136	6		30
p-Diethylbenzene	87		90		70-130	3		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG1763422-3 WG1763422-4								
p-Ethyltoluene	87		91		70-130	4		30
1,2,4,5-Tetramethylbenzene	91		94		70-130	3		30
Ethyl ether	107		112		67-130	5		30
trans-1,4-Dichloro-2-butene	69	Q	73		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	106		106		70-130
Toluene-d8	92		92		70-130
4-Bromofluorobenzene	90		90		70-130
Dibromofluoromethane	110		111		70-130

SEMIVOLATILES

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316797**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-01
 Client ID: SB02_9.75-11
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 13:15
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/03/23 04:22
 Analyst: IM
 Percent Solids: 44%

Extraction Method: EPA 3546
 Extraction Date: 04/02/23 02:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	25000	E	ug/kg	300	38.	1
1,2,4-Trichlorobenzene	ND		ug/kg	370	42.	1
Hexachlorobenzene	ND		ug/kg	220	42.	1
Bis(2-chloroethyl)ether	ND		ug/kg	330	50.	1
2-Chloronaphthalene	ND		ug/kg	370	37.	1
1,2-Dichlorobenzene	ND		ug/kg	370	67.	1
1,3-Dichlorobenzene	ND		ug/kg	370	64.	1
1,4-Dichlorobenzene	ND		ug/kg	370	65.	1
3,3'-Dichlorobenzidine	ND		ug/kg	370	99.	1
2,4-Dinitrotoluene	ND		ug/kg	370	74.	1
2,6-Dinitrotoluene	ND		ug/kg	370	64.	1
Fluoranthene	27000	E	ug/kg	220	43.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	370	40.	1
4-Bromophenyl phenyl ether	ND		ug/kg	370	57.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	440	63.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	400	37.	1
Hexachlorobutadiene	ND		ug/kg	370	54.	1
Hexachlorocyclopentadiene	ND		ug/kg	1100	340	1
Hexachloroethane	ND		ug/kg	300	60.	1
Isophorone	ND		ug/kg	330	48.	1
Naphthalene	91000	E	ug/kg	370	45.	1
Nitrobenzene	ND		ug/kg	330	55.	1
NDPA/DPA	ND		ug/kg	300	42.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	370	57.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	370	130	1
Butyl benzyl phthalate	ND		ug/kg	370	94.	1
Di-n-butylphthalate	ND		ug/kg	370	70.	1
Di-n-octylphthalate	ND		ug/kg	370	130	1

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-01
 Client ID: SB02_9.75-11
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 13:15
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	370	34.	1
Dimethyl phthalate	ND		ug/kg	370	78.	1
Benzo(a)anthracene	15000		ug/kg	220	42.	1
Benzo(a)pyrene	12000		ug/kg	300	90.	1
Benzo(b)fluoranthene	9400		ug/kg	220	62.	1
Benzo(k)fluoranthene	2100		ug/kg	220	59.	1
Chrysene	13000		ug/kg	220	38.	1
Acenaphthylene	6600		ug/kg	300	57.	1
Anthracene	20000	E	ug/kg	220	72.	1
Benzo(ghi)perylene	3000		ug/kg	300	44.	1
Fluorene	33000	E	ug/kg	370	36.	1
Phenanthrene	58000	E	ug/kg	220	45.	1
Dibenzo(a,h)anthracene	ND		ug/kg	220	43.	1
Indeno(1,2,3-cd)pyrene	2700		ug/kg	300	52.	1
Pyrene	37000	E	ug/kg	220	37.	1
Biphenyl	9700		ug/kg	850	48.	1
4-Chloroaniline	ND		ug/kg	370	68.	1
2-Nitroaniline	ND		ug/kg	370	72.	1
3-Nitroaniline	ND		ug/kg	370	70.	1
4-Nitroaniline	ND		ug/kg	370	150	1
Dibenzofuran	4600		ug/kg	370	35.	1
2-Methylnaphthalene	73000	E	ug/kg	440	45.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	370	39.	1
Acetophenone	ND		ug/kg	370	46.	1
2,4,6-Trichlorophenol	ND		ug/kg	220	70.	1
p-Chloro-m-cresol	ND		ug/kg	370	55.	1
2-Chlorophenol	ND		ug/kg	370	44.	1
2,4-Dichlorophenol	ND		ug/kg	330	60.	1
2,4-Dimethylphenol	ND		ug/kg	370	120	1
2-Nitrophenol	ND		ug/kg	800	140	1
4-Nitrophenol	ND		ug/kg	520	150	1
2,4-Dinitrophenol	ND		ug/kg	1800	170	1
4,6-Dinitro-o-cresol	ND		ug/kg	960	180	1
Pentachlorophenol	ND		ug/kg	300	82.	1
Phenol	ND		ug/kg	370	56.	1
2-Methylphenol	ND		ug/kg	370	58.	1
3-Methylphenol/4-Methylphenol	420	J	ug/kg	530	58.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS****Lab ID:** L2316797-01**Date Collected:** 03/30/23 13:15**Client ID:** SB02_9.75-11**Date Received:** 03/30/23**Sample Location:** BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	370	71.	1
Benzoic Acid	ND		ug/kg	1200	380	1
Benzyl Alcohol	ND		ug/kg	370	110	1
Carbazole	1100		ug/kg	370	36.	1
1,4-Dioxane	ND		ug/kg	56	17.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	62		25-120
Phenol-d6	55		10-120
Nitrobenzene-d5	39		23-120
2-Fluorobiphenyl	55		30-120
2,4,6-Tribromophenol	56		10-136
4-Terphenyl-d14	49		18-120

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316797**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-01 D

Client ID: SB02_9.75-11

Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 13:15

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8270E

Analytical Date: 04/06/23 10:13

Analyst: IM

Percent Solids: 44%

Extraction Method: EPA 3546

Extraction Date: 04/02/23 02:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	35000		ug/kg	12000	1500	40
Fluoranthene	37000		ug/kg	8900	1700	40
Naphthalene	460000		ug/kg	15000	1800	40
Anthracene	28000		ug/kg	8900	2900	40
Fluorene	50000		ug/kg	15000	1400	40
Phenanthrene	140000		ug/kg	8900	1800	40
Pyrene	59000		ug/kg	8900	1500	40
2-Methylnaphthalene	140000		ug/kg	18000	1800	40

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316797**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02 REVD

Client ID: SB03_A_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8270E

Analytical Date: 04/06/23 14:52

Analyst: IM

Percent Solids: 80%

Extraction Method: EPA 3546

Extraction Date: 04/06/23 09:48

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	1400		ug/kg	820	100	5
1,2,4-Trichlorobenzene	ND		ug/kg	1000	120	5
Hexachlorobenzene	ND		ug/kg	610	110	5
Bis(2-chloroethyl)ether	ND		ug/kg	920	140	5
2-Chloronaphthalene	ND		ug/kg	1000	100	5
1,2-Dichlorobenzene	ND		ug/kg	1000	180	5
1,3-Dichlorobenzene	ND		ug/kg	1000	180	5
1,4-Dichlorobenzene	ND		ug/kg	1000	180	5
3,3'-Dichlorobenzidine	ND		ug/kg	1000	270	5
2,4-Dinitrotoluene	ND		ug/kg	1000	200	5
2,6-Dinitrotoluene	ND		ug/kg	1000	170	5
Fluoranthene	5500		ug/kg	610	120	5
4-Chlorophenyl phenyl ether	ND		ug/kg	1000	110	5
4-Bromophenyl phenyl ether	ND		ug/kg	1000	160	5
Bis(2-chloroisopropyl)ether	ND		ug/kg	1200	170	5
Bis(2-chloroethoxy)methane	ND		ug/kg	1100	100	5
Hexachlorobutadiene	ND		ug/kg	1000	150	5
Hexachlorocyclopentadiene	ND		ug/kg	2900	920	5
Hexachloroethane	ND		ug/kg	820	160	5
Isophorone	ND		ug/kg	920	130	5
Naphthalene	3300		ug/kg	1000	120	5
Nitrobenzene	ND		ug/kg	920	150	5
NDPA/DPA	ND		ug/kg	820	120	5
n-Nitrosodi-n-propylamine	ND		ug/kg	1000	160	5
Bis(2-ethylhexyl)phthalate	2100		ug/kg	1000	350	5
Butyl benzyl phthalate	ND		ug/kg	1000	260	5
Di-n-butylphthalate	ND		ug/kg	1000	190	5
Di-n-octylphthalate	ND		ug/kg	1000	350	5

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-02 REVD

Date Collected: 03/30/23 16:43

Client ID: SB03_A_2-4

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	1000	94.	5
Dimethyl phthalate	ND		ug/kg	1000	210	5
Benzo(a)anthracene	3400		ug/kg	610	110	5
Benzo(a)pyrene	2600		ug/kg	820	250	5
Benzo(b)fluoranthene	2600		ug/kg	610	170	5
Benzo(k)fluoranthene	780		ug/kg	610	160	5
Chrysene	3500		ug/kg	610	110	5
Acenaphthylene	1500		ug/kg	820	160	5
Anthracene	2500		ug/kg	610	200	5
Benzo(ghi)perylene	1500		ug/kg	820	120	5
Fluorene	1500		ug/kg	1000	99.	5
Phenanthrene	5900		ug/kg	610	120	5
Dibenzo(a,h)anthracene	300	J	ug/kg	610	120	5
Indeno(1,2,3-cd)pyrene	1400		ug/kg	820	140	5
Pyrene	7600		ug/kg	610	100	5
Biphenyl	310	J	ug/kg	2300	130	5
4-Chloroaniline	ND		ug/kg	1000	180	5
2-Nitroaniline	ND		ug/kg	1000	200	5
3-Nitroaniline	ND		ug/kg	1000	190	5
4-Nitroaniline	ND		ug/kg	1000	420	5
Dibenzofuran	310	J	ug/kg	1000	96.	5
2-Methylnaphthalene	2100		ug/kg	1200	120	5
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	1000	110	5
Acetophenone	ND		ug/kg	1000	130	5
2,4,6-Trichlorophenol	ND		ug/kg	610	190	5
p-Chloro-m-cresol	ND		ug/kg	1000	150	5
2-Chlorophenol	ND		ug/kg	1000	120	5
2,4-Dichlorophenol	ND		ug/kg	920	160	5
2,4-Dimethylphenol	ND		ug/kg	1000	340	5
2-Nitrophenol	ND		ug/kg	2200	380	5
4-Nitrophenol	ND		ug/kg	1400	420	5
2,4-Dinitrophenol	ND		ug/kg	4900	470	5
4,6-Dinitro-o-cresol	ND		ug/kg	2600	490	5
Pentachlorophenol	ND		ug/kg	820	220	5
Phenol	ND		ug/kg	1000	150	5
2-Methylphenol	ND		ug/kg	1000	160	5
3-Methylphenol/4-Methylphenol	ND		ug/kg	1500	160	5

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02 REVD

Date Collected: 03/30/23 16:43

Client ID: SB03_A_2-4

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	1000	200	5
Benzoic Acid	ND		ug/kg	3300	1000	5
Benzyl Alcohol	ND		ug/kg	1000	310	5
Carbazole	220	J	ug/kg	1000	99.	5
1,4-Dioxane	ND		ug/kg	150	47.	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	0	Q	25-120
Phenol-d6	19		10-120
Nitrobenzene-d5	69		23-120
2-Fluorobiphenyl	64		30-120
2,4,6-Tribromophenol	0	Q	10-136
4-Terphenyl-d14	58		18-120

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316797**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02 D

Client ID: SB03_A_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8270E

Analytical Date: 04/05/23 16:29

Analyst: IM

Percent Solids: 80%

Extraction Method: EPA 3546

Extraction Date: 04/02/23 02:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	1700		ug/kg	810	100	5
1,2,4-Trichlorobenzene	ND		ug/kg	1000	120	5
Hexachlorobenzene	ND		ug/kg	610	110	5
Bis(2-chloroethyl)ether	ND		ug/kg	920	140	5
2-Chloronaphthalene	ND		ug/kg	1000	100	5
1,2-Dichlorobenzene	ND		ug/kg	1000	180	5
1,3-Dichlorobenzene	ND		ug/kg	1000	170	5
1,4-Dichlorobenzene	ND		ug/kg	1000	180	5
3,3'-Dichlorobenzidine	ND		ug/kg	1000	270	5
2,4-Dinitrotoluene	ND		ug/kg	1000	200	5
2,6-Dinitrotoluene	ND		ug/kg	1000	170	5
Fluoranthene	6700		ug/kg	610	120	5
4-Chlorophenyl phenyl ether	ND		ug/kg	1000	110	5
4-Bromophenyl phenyl ether	ND		ug/kg	1000	160	5
Bis(2-chloroisopropyl)ether	ND		ug/kg	1200	170	5
Bis(2-chloroethoxy)methane	ND		ug/kg	1100	100	5
Hexachlorobutadiene	ND		ug/kg	1000	150	5
Hexachlorocyclopentadiene	ND		ug/kg	2900	920	5
Hexachloroethane	ND		ug/kg	810	160	5
Isophorone	ND		ug/kg	920	130	5
Naphthalene	3900		ug/kg	1000	120	5
Nitrobenzene	ND		ug/kg	920	150	5
NDPA/DPA	270	J	ug/kg	810	120	5
n-Nitrosodi-n-propylamine	ND		ug/kg	1000	160	5
Bis(2-ethylhexyl)phthalate	1900		ug/kg	1000	350	5
Butyl benzyl phthalate	ND		ug/kg	1000	260	5
Di-n-butylphthalate	ND		ug/kg	1000	190	5
Di-n-octylphthalate	ND		ug/kg	1000	340	5

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02 D

Date Collected: 03/30/23 16:43

Client ID: SB03_A_2-4

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	1000	94.	5
Dimethyl phthalate	ND		ug/kg	1000	210	5
Benzo(a)anthracene	4200		ug/kg	610	110	5
Benzo(a)pyrene	3200		ug/kg	810	250	5
Benzo(b)fluoranthene	3000		ug/kg	610	170	5
Benzo(k)fluoranthene	1000		ug/kg	610	160	5
Chrysene	4400		ug/kg	610	100	5
Acenaphthylene	1800		ug/kg	810	160	5
Anthracene	2800		ug/kg	610	200	5
Benzo(ghi)perylene	1800		ug/kg	810	120	5
Fluorene	1700		ug/kg	1000	99.	5
Phenanthrene	6700		ug/kg	610	120	5
Dibenzo(a,h)anthracene	370	J	ug/kg	610	120	5
Indeno(1,2,3-cd)pyrene	1700		ug/kg	810	140	5
Pyrene	9300		ug/kg	610	100	5
Biphenyl	320	J	ug/kg	2300	130	5
4-Chloroaniline	ND		ug/kg	1000	180	5
2-Nitroaniline	ND		ug/kg	1000	200	5
3-Nitroaniline	ND		ug/kg	1000	190	5
4-Nitroaniline	ND		ug/kg	1000	420	5
Dibenzofuran	360	J	ug/kg	1000	96.	5
2-Methylnaphthalene	2400		ug/kg	1200	120	5
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	1000	110	5
Acetophenone	ND		ug/kg	1000	120	5
2,4,6-Trichlorophenol	ND		ug/kg	610	190	5
p-Chloro-m-cresol	ND		ug/kg	1000	150	5
2-Chlorophenol	ND		ug/kg	1000	120	5
2,4-Dichlorophenol	ND		ug/kg	920	160	5
2,4-Dimethylphenol	ND		ug/kg	1000	340	5
2-Nitrophenol	ND		ug/kg	2200	380	5
4-Nitrophenol	ND		ug/kg	1400	420	5
2,4-Dinitrophenol	ND		ug/kg	4900	470	5
4,6-Dinitro-o-cresol	ND		ug/kg	2600	490	5
Pentachlorophenol	ND		ug/kg	810	220	5
Phenol	360	J	ug/kg	1000	150	5
2-Methylphenol	ND		ug/kg	1000	160	5
3-Methylphenol/4-Methylphenol	ND		ug/kg	1500	160	5

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-02 D

Date Collected: 03/30/23 16:43

Client ID: SB03_A_2-4

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	1000	190	5
Benzoic Acid	ND		ug/kg	3300	1000	5
Benzyl Alcohol	ND		ug/kg	1000	310	5
Carbazole	270	J	ug/kg	1000	99.	5
1,4-Dioxane	ND		ug/kg	150	47.	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	3	Q	25-120
Phenol-d6	48		10-120
Nitrobenzene-d5	94		23-120
2-Fluorobiphenyl	71		30-120
2,4,6-Tribromophenol	0	Q	10-136
4-Terphenyl-d14	64		18-120

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2316797**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-03
 Client ID: SB03_A_12-14
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/03/23 04:54
 Analyst: IM
 Percent Solids: 71%

Extraction Method: EPA 3546
 Extraction Date: 04/02/23 02:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	400		ug/kg	190	24.	1
1,2,4-Trichlorobenzene	ND		ug/kg	230	27.	1
Hexachlorobenzene	ND		ug/kg	140	26.	1
Bis(2-chloroethyl)ether	ND		ug/kg	210	32.	1
2-Chloronaphthalene	ND		ug/kg	230	23.	1
1,2-Dichlorobenzene	ND		ug/kg	230	42.	1
1,3-Dichlorobenzene	ND		ug/kg	230	40.	1
1,4-Dichlorobenzene	ND		ug/kg	230	41.	1
3,3'-Dichlorobenzidine	ND		ug/kg	230	62.	1
2,4-Dinitrotoluene	ND		ug/kg	230	46.	1
2,6-Dinitrotoluene	ND		ug/kg	230	40.	1
Fluoranthene	ND		ug/kg	140	27.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	230	25.	1
4-Bromophenyl phenyl ether	ND		ug/kg	230	36.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	280	40.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	250	23.	1
Hexachlorobutadiene	ND		ug/kg	230	34.	1
Hexachlorocyclopentadiene	ND		ug/kg	660	210	1
Hexachloroethane	ND		ug/kg	190	38.	1
Isophorone	ND		ug/kg	210	30.	1
Naphthalene	48	J	ug/kg	230	28.	1
Nitrobenzene	ND		ug/kg	210	34.	1
NDPA/DPA	ND		ug/kg	190	26.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	230	36.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	230	80.	1
Butyl benzyl phthalate	ND		ug/kg	230	59.	1
Di-n-butylphthalate	ND		ug/kg	230	44.	1
Di-n-octylphthalate	ND		ug/kg	230	79.	1

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-03
 Client ID: SB03_A_12-14
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	230	22.	1
Dimethyl phthalate	ND		ug/kg	230	49.	1
Benzo(a)anthracene	ND		ug/kg	140	26.	1
Benzo(a)pyrene	210		ug/kg	190	57.	1
Benzo(b)fluoranthene	73	J	ug/kg	140	39.	1
Benzo(k)fluoranthene	ND		ug/kg	140	37.	1
Chrysene	ND		ug/kg	140	24.	1
Acenaphthylene	72	J	ug/kg	190	36.	1
Anthracene	ND		ug/kg	140	45.	1
Benzo(ghi)perylene	700		ug/kg	190	27.	1
Fluorene	130	J	ug/kg	230	23.	1
Phenanthrene	ND		ug/kg	140	28.	1
Dibenzo(a,h)anthracene	93	J	ug/kg	140	27.	1
Indeno(1,2,3-cd)pyrene	410		ug/kg	190	32.	1
Pyrene	ND		ug/kg	140	23.	1
Biphenyl	ND		ug/kg	530	30.	1
4-Chloroaniline	ND		ug/kg	230	42.	1
2-Nitroaniline	ND		ug/kg	230	45.	1
3-Nitroaniline	ND		ug/kg	230	44.	1
4-Nitroaniline	ND		ug/kg	230	96.	1
Dibenzofuran	ND		ug/kg	230	22.	1
2-Methylnaphthalene	ND		ug/kg	280	28.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	230	24.	1
Acetophenone	ND		ug/kg	230	29.	1
2,4,6-Trichlorophenol	ND		ug/kg	140	44.	1
p-Chloro-m-cresol	ND		ug/kg	230	35.	1
2-Chlorophenol	ND		ug/kg	230	28.	1
2,4-Dichlorophenol	ND		ug/kg	210	37.	1
2,4-Dimethylphenol	ND		ug/kg	230	77.	1
2-Nitrophenol	ND		ug/kg	500	87.	1
4-Nitrophenol	ND		ug/kg	320	95.	1
2,4-Dinitrophenol	ND		ug/kg	1100	110	1
4,6-Dinitro-o-cresol	ND		ug/kg	600	110	1
Pentachlorophenol	ND		ug/kg	190	51.	1
Phenol	ND		ug/kg	230	35.	1
2-Methylphenol	ND		ug/kg	230	36.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	340	36.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316797-03
 Client ID: SB03_A_12-14
 Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	230	44.	1
Benzoic Acid	ND		ug/kg	750	240	1
Benzyl Alcohol	ND		ug/kg	230	71.	1
Carbazole	ND		ug/kg	230	23.	1
1,4-Dioxane	ND		ug/kg	35	11.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	56		25-120
Phenol-d6	55		10-120
Nitrobenzene-d5	31		23-120
2-Fluorobiphenyl	60		30-120
2,4,6-Tribromophenol	27		10-136
4-Terphenyl-d14	50		18-120

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:25
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 04/01/23 12:41

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1761604-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	98	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	29.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	28.
3,3'-Dichlorobenzidine	ND		ug/kg	160	44.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	98	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	18.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	26.
Isophorone	ND		ug/kg	150	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	19.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	57.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:25
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 04/01/23 12:41

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1761604-1					
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	98	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	98	28.
Benzo(k)fluoranthene	ND		ug/kg	98	26.
Chrysene	ND		ug/kg	98	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	98	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	98	20.
Dibenzo(a,h)anthracene	ND		ug/kg	98	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	98	16.
Biphenyl	ND		ug/kg	370	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	32.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	15.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	98	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	350	62.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/02/23 18:25
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 04/01/23 12:41

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1761604-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	780	76.
4,6-Dinitro-o-cresol	ND		ug/kg	420	78.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	25.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	31.
Benzoic Acid	ND		ug/kg	530	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	24	7.5

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	65		25-120
Phenol-d6	69		10-120
Nitrobenzene-d5	68		23-120
2-Fluorobiphenyl	57		30-120
2,4,6-Tribromophenol	57		10-136
4-Terphenyl-d14	56		18-120

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 21:57
Analyst: IM

Extraction Method: EPA 3546
Extraction Date: 04/05/23 11:39

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG1763075-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	99	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	30.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	29.
3,3'-Dichlorobenzidine	ND		ug/kg	160	44.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	99	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	18.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	27.
Isophorone	ND		ug/kg	150	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	19.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	57.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 21:57
Analyst: IM

Extraction Method: EPA 3546
Extraction Date: 04/05/23 11:39

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG1763075-1					
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	99	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	99	28.
Benzo(k)fluoranthene	ND		ug/kg	99	26.
Chrysene	ND		ug/kg	99	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	99	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	99	20.
Dibenzo(a,h)anthracene	ND		ug/kg	99	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	99	16.
Biphenyl	ND		ug/kg	380	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	32.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	16.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	99	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	360	62.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 21:57
Analyst: IM

Extraction Method: EPA 3546
Extraction Date: 04/05/23 11:39

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG1763075-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	790	77.
4,6-Dinitro-o-cresol	ND		ug/kg	430	79.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	26.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	32.
Benzoic Acid	ND		ug/kg	530	170
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	25	7.6

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	69		25-120
Phenol-d6	70		10-120
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	74		30-120
2,4,6-Tribromophenol	73		10-136
4-Terphenyl-d14	77		18-120

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1761604-2 WG1761604-3								
Acenaphthene	76		77		31-137	1		50
1,2,4-Trichlorobenzene	69		75		38-107	8		50
Hexachlorobenzene	76		73		40-140	4		50
Bis(2-chloroethyl)ether	78		86		40-140	10		50
2-Chloronaphthalene	76		75		40-140	1		50
1,2-Dichlorobenzene	66		73		40-140	10		50
1,3-Dichlorobenzene	64		72		40-140	12		50
1,4-Dichlorobenzene	65		73		28-104	12		50
3,3'-Dichlorobenzidine	73		65		40-140	12		50
2,4-Dinitrotoluene	79		78		40-132	1		50
2,6-Dinitrotoluene	75		74		40-140	1		50
Fluoranthene	76		75		40-140	1		50
4-Chlorophenyl phenyl ether	73		72		40-140	1		50
4-Bromophenyl phenyl ether	73		72		40-140	1		50
Bis(2-chloroisopropyl)ether	88		98		40-140	11		50
Bis(2-chloroethoxy)methane	85		92		40-117	8		50
Hexachlorobutadiene	59		61		40-140	3		50
Hexachlorocyclopentadiene	61		63		40-140	3		50
Hexachloroethane	65		75		40-140	14		50
Isophorone	83		89		40-140	7		50
Naphthalene	71		74		40-140	4		50
Nitrobenzene	84		92		40-140	9		50
NDPA/DPA	82		81		36-157	1		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1761604-2 WG1761604-3								
n-Nitrosodi-n-propylamine	88		98		32-121	11		50
Bis(2-ethylhexyl)phthalate	91		88		40-140	3		50
Butyl benzyl phthalate	84		84		40-140	0		50
Di-n-butylphthalate	84		82		40-140	2		50
Di-n-octylphthalate	91		87		40-140	4		50
Diethyl phthalate	83		83		40-140	0		50
Dimethyl phthalate	76		75		40-140	1		50
Benzo(a)anthracene	78		76		40-140	3		50
Benzo(a)pyrene	78		74		40-140	5		50
Benzo(b)fluoranthene	73		68		40-140	7		50
Benzo(k)fluoranthene	77		75		40-140	3		50
Chrysene	78		74		40-140	5		50
Acenaphthylene	83		82		40-140	1		50
Anthracene	77		77		40-140	0		50
Benzo(ghi)perylene	71		67		40-140	6		50
Fluorene	79		78		40-140	1		50
Phenanthrene	75		74		40-140	1		50
Dibenzo(a,h)anthracene	69		68		40-140	1		50
Indeno(1,2,3-cd)pyrene	72		71		40-140	1		50
Pyrene	78		76		35-142	3		50
Biphenyl	76		75		37-127	1		50
4-Chloroaniline	89		81		40-140	9		50
2-Nitroaniline	84		80		47-134	5		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1761604-2 WG1761604-3								
3-Nitroaniline	80		76		26-129	5		50
4-Nitroaniline	83		84		41-125	1		50
Dibenzofuran	78		77		40-140	1		50
2-Methylnaphthalene	72		74		40-140	3		50
1,2,4,5-Tetrachlorobenzene	69		71		40-117	3		50
Acetophenone	83		91		14-144	9		50
2,4,6-Trichlorophenol	77		76		30-130	1		50
p-Chloro-m-cresol	87		85		26-103	2		50
2-Chlorophenol	77		84		25-102	9		50
2,4-Dichlorophenol	81		86		30-130	6		50
2,4-Dimethylphenol	84		90		30-130	7		50
2-Nitrophenol	77		85		30-130	10		50
4-Nitrophenol	106		102		11-114	4		50
2,4-Dinitrophenol	79		78		4-130	1		50
4,6-Dinitro-o-cresol	87		82		10-130	6		50
Pentachlorophenol	88		85		17-109	3		50
Phenol	86		92	Q	26-90	7		50
2-Methylphenol	84		91		30-130	8		50
3-Methylphenol/4-Methylphenol	93		102		30-130	9		50
2,4,5-Trichlorophenol	80		80		30-130	0		50
Benzoic Acid	92		80		10-110	14		50
Benzyl Alcohol	92		99		40-140	7		50
Carbazole	80		76		54-128	5		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1761604-2 WG1761604-3								
1,4-Dioxane	52		57		40-140	9		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	79		88		25-120
Phenol-d6	84		90		10-120
Nitrobenzene-d5	82		89		23-120
2-Fluorobiphenyl	72		72		30-120
2,4,6-Tribromophenol	78		76		10-136
4-Terphenyl-d14	69		67		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG1763075-2 WG1763075-3								
Acenaphthene	75		84		31-137	11		50
1,2,4-Trichlorobenzene	70		76		38-107	8		50
Hexachlorobenzene	78		86		40-140	10		50
Bis(2-chloroethyl)ether	63		69		40-140	9		50
2-Chloronaphthalene	75		82		40-140	9		50
1,2-Dichlorobenzene	69		73		40-140	6		50
1,3-Dichlorobenzene	67		72		40-140	7		50
1,4-Dichlorobenzene	67		73		28-104	9		50
3,3'-Dichlorobenzidine	60		65		40-140	8		50
2,4-Dinitrotoluene	81		90		40-132	11		50
2,6-Dinitrotoluene	76		82		40-140	8		50
Fluoranthene	80		88		40-140	10		50
4-Chlorophenyl phenyl ether	78		87		40-140	11		50
4-Bromophenyl phenyl ether	83		92		40-140	10		50
Bis(2-chloroisopropyl)ether	75		80		40-140	6		50
Bis(2-chloroethoxy)methane	66		71		40-117	7		50
Hexachlorobutadiene	73		80		40-140	9		50
Hexachlorocyclopentadiene	62		68		40-140	9		50
Hexachloroethane	68		73		40-140	7		50
Isophorone	64		69		40-140	8		50
Naphthalene	70		76		40-140	8		50
Nitrobenzene	64		69		40-140	8		50
NDPA/DPA	82		90		36-157	9		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG1763075-2 WG1763075-3								
n-Nitrosodi-n-propylamine	65		71		32-121	9		50
Bis(2-ethylhexyl)phthalate	78		87		40-140	11		50
Butyl benzyl phthalate	76		84		40-140	10		50
Di-n-butylphthalate	78		86		40-140	10		50
Di-n-octylphthalate	79		86		40-140	8		50
Diethyl phthalate	78		85		40-140	9		50
Dimethyl phthalate	74		80		40-140	8		50
Benzo(a)anthracene	80		89		40-140	11		50
Benzo(a)pyrene	88		99		40-140	12		50
Benzo(b)fluoranthene	84		93		40-140	10		50
Benzo(k)fluoranthene	81		90		40-140	11		50
Chrysene	80		87		40-140	8		50
Acenaphthylene	80		87		40-140	8		50
Anthracene	79		88		40-140	11		50
Benzo(ghi)perylene	76		87		40-140	13		50
Fluorene	78		86		40-140	10		50
Phenanthrene	76		84		40-140	10		50
Dibenzo(a,h)anthracene	75		84		40-140	11		50
Indeno(1,2,3-cd)pyrene	78		89		40-140	13		50
Pyrene	80		88		35-142	10		50
Biphenyl	70		77		37-127	10		50
4-Chloroaniline	50		54		40-140	8		50
2-Nitroaniline	75		83		47-134	10		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG1763075-2 WG1763075-3								
3-Nitroaniline	57		63		26-129	10		50
4-Nitroaniline	75		84		41-125	11		50
Dibenzofuran	77		85		40-140	10		50
2-Methylnaphthalene	72		79		40-140	9		50
1,2,4,5-Tetrachlorobenzene	77		85		40-117	10		50
Acetophenone	64		70		14-144	9		50
2,4,6-Trichlorophenol	85		92		30-130	8		50
p-Chloro-m-cresol	77		84		26-103	9		50
2-Chlorophenol	71		78		25-102	9		50
2,4-Dichlorophenol	77		83		30-130	8		50
2,4-Dimethylphenol	74		81		30-130	9		50
2-Nitrophenol	71		78		30-130	9		50
4-Nitrophenol	72		82		11-114	13		50
2,4-Dinitrophenol	73		82		4-130	12		50
4,6-Dinitro-o-cresol	82		91		10-130	10		50
Pentachlorophenol	75		83		17-109	10		50
Phenol	73		79		26-90	8		50
2-Methylphenol	69		76		30-130.	10		50
3-Methylphenol/4-Methylphenol	74		82		30-130	10		50
2,4,5-Trichlorophenol	84		92		30-130	9		50
Benzoic Acid	50		54		10-110	8		50
Benzyl Alcohol	68		73		40-140	7		50
Carbazole	77		86		54-128	11		50

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG1763075-2 WG1763075-3								
1,4-Dioxane	54		52		40-140	4		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	72		80		25-120
Phenol-d6	72		80		10-120
Nitrobenzene-d5	66		74		23-120
2-Fluorobiphenyl	77		84		30-120
2,4,6-Tribromophenol	75		84		10-136
4-Terphenyl-d14	75		83		18-120

METALS

Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-01

Date Collected: 03/30/23 13:15

Client ID: SB02_9.75-11

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	7420		mg/kg	17.8	4.81	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Antimony, Total	0.898	J	mg/kg	8.90	0.677	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Arsenic, Total	9.17		mg/kg	1.78	0.370	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Barium, Total	15.8		mg/kg	1.78	0.310	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Beryllium, Total	0.374	J	mg/kg	0.890	0.059	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Cadmium, Total	0.196	J	mg/kg	1.78	0.174	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Calcium, Total	2480		mg/kg	17.8	6.23	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Chromium, Total	16.9		mg/kg	1.78	0.171	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Cobalt, Total	6.48		mg/kg	3.56	0.296	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Copper, Total	23.2		mg/kg	1.78	0.459	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Iron, Total	15800		mg/kg	8.90	1.61	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Lead, Total	42.5		mg/kg	8.90	0.477	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Magnesium, Total	2200		mg/kg	17.8	2.74	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Manganese, Total	82.8		mg/kg	1.78	0.283	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Mercury, Total	0.257		mg/kg	0.155	0.101	1	04/05/23 22:06	04/06/23 08:35	EPA 7471B	1,7471B	DMB
Nickel, Total	23.2		mg/kg	4.45	0.431	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Potassium, Total	1140		mg/kg	445	25.6	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Selenium, Total	0.842	J	mg/kg	3.56	0.459	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Silver, Total	ND		mg/kg	0.890	0.504	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Sodium, Total	664		mg/kg	356	5.61	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Thallium, Total	ND		mg/kg	3.56	0.561	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Vanadium, Total	25.6		mg/kg	1.78	0.362	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF
Zinc, Total	75.6		mg/kg	8.90	0.522	2	04/05/23 21:10	04/06/23 08:59	EPA 3050B	1,6010D	JMF

General Chemistry - Mansfield Lab

Chromium, Trivalent	16.4	J	mg/kg	1.83	1.83	1		04/06/23 08:59	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-02

Date Collected: 03/30/23 16:43

Client ID: SB03_A_2-4

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	7080		mg/kg	9.80	2.65	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Antimony, Total	2.82	J	mg/kg	4.90	0.372	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Arsenic, Total	9.45		mg/kg	0.980	0.204	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Barium, Total	117		mg/kg	0.980	0.170	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Beryllium, Total	0.304	J	mg/kg	0.490	0.032	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Cadmium, Total	1.26		mg/kg	0.980	0.096	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Calcium, Total	51000		mg/kg	9.80	3.43	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Chromium, Total	37.2		mg/kg	0.980	0.094	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Cobalt, Total	4.45		mg/kg	1.96	0.163	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Copper, Total	149		mg/kg	0.980	0.253	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Iron, Total	15400		mg/kg	4.90	0.885	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Lead, Total	279		mg/kg	4.90	0.263	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Magnesium, Total	8330		mg/kg	9.80	1.51	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Manganese, Total	187		mg/kg	0.980	0.156	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Mercury, Total	0.686		mg/kg	0.083	0.054	1	04/05/23 22:06	04/06/23 08:39	EPA 7471B	1,7471B	DMB
Nickel, Total	21.3		mg/kg	2.45	0.237	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Potassium, Total	1250		mg/kg	245	14.1	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Selenium, Total	0.469	J	mg/kg	1.96	0.253	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Silver, Total	1.72		mg/kg	0.490	0.277	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Sodium, Total	711		mg/kg	196	3.09	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Thallium, Total	0.377	J	mg/kg	1.96	0.309	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Vanadium, Total	26.8		mg/kg	0.980	0.199	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF
Zinc, Total	267		mg/kg	4.90	0.287	2	04/05/23 21:10	04/06/23 09:02	EPA 3050B	1,6010D	JMF

General Chemistry - Mansfield Lab

Chromium, Trivalent	37.0	J	mg/kg	1.00	1.00	1		04/06/23 09:02	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-03

Date Collected: 03/30/23 17:05

Client ID: SB03_A_12-14

Date Received: 03/30/23

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	3420		mg/kg	11.1	3.00	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Antimony, Total	ND		mg/kg	5.56	0.422	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Arsenic, Total	2.95		mg/kg	1.11	0.231	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Barium, Total	13.6		mg/kg	1.11	0.193	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Beryllium, Total	0.174	J	mg/kg	0.556	0.037	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Cadmium, Total	ND		mg/kg	1.11	0.109	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Calcium, Total	909		mg/kg	11.1	3.89	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Chromium, Total	8.20		mg/kg	1.11	0.107	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Cobalt, Total	2.01	J	mg/kg	2.22	0.184	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Copper, Total	2.77		mg/kg	1.11	0.287	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Iron, Total	6900		mg/kg	5.56	1.00	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Lead, Total	3.06	J	mg/kg	5.56	0.298	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Magnesium, Total	1240		mg/kg	11.1	1.71	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Manganese, Total	61.8		mg/kg	1.11	0.177	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Mercury, Total	ND		mg/kg	0.101	0.066	1	04/05/23 22:06	04/06/23 08:49	EPA 7471B	1,7471B	DMB
Nickel, Total	7.11		mg/kg	2.78	0.269	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Potassium, Total	616		mg/kg	278	16.0	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Selenium, Total	ND		mg/kg	2.22	0.287	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Silver, Total	ND		mg/kg	0.556	0.314	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Sodium, Total	420		mg/kg	222	3.50	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Thallium, Total	ND		mg/kg	2.22	0.350	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Vanadium, Total	12.2		mg/kg	1.11	0.226	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF
Zinc, Total	12.6		mg/kg	5.56	0.326	2	04/05/23 21:10	04/06/23 09:05	EPA 3050B	1,6010D	JMF

General Chemistry - Mansfield Lab

Chromium, Trivalent	7.88	J	mg/kg	1.13	1.13	1		04/06/23 09:05	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1761364-1										
Aluminum, Total	ND		mg/kg	4.00	1.08	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Antimony, Total	ND		mg/kg	2.00	0.152	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Arsenic, Total	ND		mg/kg	0.400	0.083	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Barium, Total	ND		mg/kg	0.400	0.070	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Beryllium, Total	ND		mg/kg	0.200	0.013	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Cadmium, Total	ND		mg/kg	0.400	0.039	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Calcium, Total	ND		mg/kg	4.00	1.40	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Chromium, Total	ND		mg/kg	0.400	0.038	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Cobalt, Total	ND		mg/kg	0.800	0.066	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Copper, Total	ND		mg/kg	0.400	0.103	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Iron, Total	2.11		mg/kg	2.00	0.361	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Lead, Total	ND		mg/kg	2.00	0.107	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Magnesium, Total	ND		mg/kg	4.00	0.616	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Manganese, Total	ND		mg/kg	0.400	0.064	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Nickel, Total	ND		mg/kg	1.00	0.097	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Potassium, Total	ND		mg/kg	100	5.76	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Selenium, Total	ND		mg/kg	0.800	0.103	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Silver, Total	ND		mg/kg	0.200	0.113	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Sodium, Total	2.85	J	mg/kg	80.0	1.26	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Thallium, Total	0.157	J	mg/kg	0.800	0.126	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Vanadium, Total	ND		mg/kg	0.400	0.081	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF
Zinc, Total	ND		mg/kg	2.00	0.117	1	04/05/23 21:10	04/06/23 07:55	1,6010D	JMF

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1761365-1										
Mercury, Total	ND		mg/kg	0.083	0.054	1	04/05/23 22:06	04/06/23 07:52	1,7471B	DMB



Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Prep Information

Digestion Method: EPA 7471B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1761364-2 SRM Lot Number: D116-540								
Aluminum, Total	91		-		45-155	-		
Antimony, Total	183		-		2-205	-		
Arsenic, Total	104		-		82-119	-		
Barium, Total	94		-		82-118	-		
Beryllium, Total	101		-		82-118	-		
Cadmium, Total	97		-		82-118	-		
Calcium, Total	93		-		81-119	-		
Chromium, Total	99		-		81-118	-		
Cobalt, Total	96		-		83-117	-		
Copper, Total	102		-		83-117	-		
Iron, Total	104		-		58-142	-		
Lead, Total	99		-		83-117	-		
Magnesium, Total	101		-		75-125	-		
Manganese, Total	94		-		82-118	-		
Nickel, Total	98		-		82-118	-		
Potassium, Total	93		-		68-131	-		
Selenium, Total	105		-		78-122	-		
Silver, Total	102		-		79-121	-		
Sodium, Total	97		-		71-130	-		
Thallium, Total	106		-		80-120	-		
Vanadium, Total	100		-		78-122	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1761364-2 SRM Lot Number: D116-540					
Zinc, Total	98	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1761365-2 SRM Lot Number: D116-540					
Mercury, Total	101	-	58-142	-	

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03			QC Batch ID: WG1761364-3			QC Sample: L2316705-01			Client ID: MS Sample			
Aluminum, Total	6730	172	7590	501	Q	-	-		75-125	-		20
Antimony, Total	ND	42.9	36.7	86		-	-		75-125	-		20
Arsenic, Total	5.20	10.3	14.6	91		-	-		75-125	-		20
Barium, Total	76.7	172	241	96		-	-		75-125	-		20
Beryllium, Total	0.265J	4.29	4.13	96		-	-		75-125	-		20
Cadmium, Total	0.265J	4.55	3.97	87		-	-		75-125	-		20
Calcium, Total	11500	858	13300	210	Q	-	-		75-125	-		20
Chromium, Total	24.2	17.2	37.7	79		-	-		75-125	-		20
Cobalt, Total	7.81	42.9	45.6	88		-	-		75-125	-		20
Copper, Total	34.2	21.4	55.8	101		-	-		75-125	-		20
Iron, Total	16500	85.8	17600	1280	Q	-	-		75-125	-		20
Lead, Total	43.0	45.5	92.2	108		-	-		75-125	-		20
Magnesium, Total	5460	858	6130	78		-	-		75-125	-		20
Manganese, Total	339	42.9	401	144	Q	-	-		75-125	-		20
Nickel, Total	16.3	42.9	53.0	86		-	-		75-125	-		20
Potassium, Total	2390	858	3310	107		-	-		75-125	-		20
Selenium, Total	ND	10.3	10.8	105		-	-		75-125	-		20
Silver, Total	0.301J	4.29	4.19	98		-	-		75-125	-		20
Sodium, Total	146J	858	963	112		-	-		75-125	-		20
Thallium, Total	0.521J	10.3	11.3	110		-	-		75-125	-		20
Vanadium, Total	26.2	42.9	66.4	94		-	-		75-125	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03			QC Batch ID: WG1761364-3		QC Sample: L2316705-01		Client ID: MS Sample		
Zinc, Total	80.2	42.9	118	88	-	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-03			QC Batch ID: WG1761365-3		QC Sample: L2315295-21		Client ID: MS Sample		
Mercury, Total	ND	1.66	1.81	109	-	-	80-120	-	20

Lab Duplicate Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1761364-4 QC Sample: L2316705-01 Client ID: DUP Sample						
Aluminum, Total	6730	7470	mg/kg	10		20
Antimony, Total	ND	ND	mg/kg	NC		20
Arsenic, Total	5.20	3.96	mg/kg	27	Q	20
Barium, Total	76.7	81.0	mg/kg	5		20
Beryllium, Total	0.265J	0.326J	mg/kg	NC		20
Cadmium, Total	0.265J	0.319J	mg/kg	NC		20
Calcium, Total	11500	11800	mg/kg	3		20
Chromium, Total	24.2	22.9	mg/kg	6		20
Cobalt, Total	7.81	8.77	mg/kg	12		20
Copper, Total	34.2	34.4	mg/kg	1		20
Iron, Total	16500	18400	mg/kg	11		20
Lead, Total	43.0	44.6	mg/kg	4		20
Magnesium, Total	5460	5580	mg/kg	2		20
Manganese, Total	339	384	mg/kg	12		20
Nickel, Total	16.3	17.2	mg/kg	5		20
Potassium, Total	2390	2600	mg/kg	8		20
Selenium, Total	ND	ND	mg/kg	NC		20
Silver, Total	0.301J	0.329J	mg/kg	NC		20
Sodium, Total	146J	133J	mg/kg	NC		20

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Duplicate Analysis
Batch Quality Control

Lab Number: L2316797
Report Date: 04/06/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1761364-4 QC Sample: L2316705-01 Client ID: DUP Sample					
Thallium, Total	0.521J	0.648J	mg/kg	NC	20
Vanadium, Total	26.2	28.3	mg/kg	8	20
Zinc, Total	80.2	88.9	mg/kg	10	20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1761365-4 QC Sample: L2315295-21 Client ID: DUP Sample					
Mercury, Total	ND	0.061J	mg/kg	NC	20

INORGANICS & MISCELLANEOUS

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-01

Client ID: SB02_9.75-11

Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 13:15

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	43.7		%	0.100	NA	1	-	03/31/23 11:02	121,2540G	ROI
Cyanide, Total	ND		mg/kg	2.1	0.45	1	04/04/23 11:40	04/05/23 09:52	1,9010C/9012B	JER
Chromium, Hexavalent	0.526	J	mg/kg	1.83	0.366	1	04/04/23 21:00	04/05/23 17:54	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-02

Client ID: SB03_A_2-4

Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 16:43

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	80.0		%	0.100	NA	1	-	03/31/23 11:02	121,2540G	ROI
Cyanide, Total	1.7		mg/kg	1.2	0.25	1	04/05/23 01:35	04/06/23 10:58	1,9010C/9012B	JER
Chromium, Hexavalent	0.212	J	mg/kg	1.00	0.200	1	04/04/23 21:00	04/05/23 17:54	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

SAMPLE RESULTS

Lab ID: L2316797-03

Client ID: SB03_A_12-14

Sample Location: BROOKLYN, NY

Date Collected: 03/30/23 17:05

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	70.8		%	0.100	NA	1	-	03/31/23 11:02	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.3	0.28	1	04/05/23 01:35	04/06/23 10:59	1,9010C/9012B	JER
Chromium, Hexavalent	0.325	J	mg/kg	1.13	0.226	1	04/04/23 21:00	04/05/23 17:54	1,7196A	LOF



Project Name: 2731 W 12TH ST

Lab Number: L2316797

Project Number: 170697301

Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1762406-1										
Cyanide, Total	ND		mg/kg	0.88	0.19	1	04/04/23 11:40	04/05/23 09:26	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 02-03 Batch: WG1762751-1										
Cyanide, Total	ND		mg/kg	0.89	0.19	1	04/05/23 01:35	04/06/23 10:27	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1762784-1										
Chromium, Hexavalent	ND		mg/kg	0.800	0.160	1	04/04/23 21:00	04/05/23 17:54	1,7196A	LOF

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2316797

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1762406-2 WG1762406-3								
Cyanide, Total	79	Q	100		80-120	24		35
General Chemistry - Westborough Lab Associated sample(s): 02-03 Batch: WG1762751-2 WG1762751-3								
Cyanide, Total	71	Q	92		80-120	26		35
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1762784-2								
Chromium, Hexavalent	79	Q	-		80-120	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1762406-4 WG1762406-5 QC Sample: L2316705-01 Client ID: MS Sample												
Cyanide, Total	ND	11	12	110		11	100		75-125	10		35
General Chemistry - Westborough Lab Associated sample(s): 02-03 QC Batch ID: WG1762751-4 WG1762751-5 QC Sample: L2316620-01 Client ID: MS Sample												
Cyanide, Total	ND	10	2.0	20	Q	9.6	100		75-125	130	Q	35
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1762784-4 QC Sample: L2316797-01 Client ID: SB02_9.75-11												
Chromium, Hexavalent	0.526J	2600	1840	71	Q	-	-		75-125	-		20

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L2316797
Report Date: 04/06/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1761193-1 QC Sample: L2315845-01 Client ID: DUP Sample						
Solids, Total	22.4	22.7	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1762784-6 QC Sample: L2316797-01 Client ID: SB02_9.75-11						
Chromium, Hexavalent	0.526J	ND	mg/kg	NC		20

Project Name: 2731 W 12TH ST
Project Number: 170697301

Serial_No:04062317:52
Lab Number: L2316797
Report Date: 04/06/23

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316797-01A	Vial MeOH preserved	A	NA		4.1	Y	Absent		NYTCL-8260HLW(14)
L2316797-01B	Vial water preserved	A	NA		4.1	Y	Absent	31-MAR-23 07:35	NYTCL-8260HLW(14)
L2316797-01C	Vial water preserved	A	NA		4.1	Y	Absent	31-MAR-23 07:35	NYTCL-8260HLW(14)
L2316797-01D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.1	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),NI-TI(180),AL-TI(180),CR-TI(180),TL-TI(180),ZN-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),CU-TI(180),CO-TI(180),V-TI(180),MN-TI(180),FE-TI(180),HG-T(28),MG-TI(180),K-TI(180),CA-TI(180),CD-TI(180),NA-TI(180)
L2316797-01E	Plastic 120ml unpreserved	A	NA		4.1	Y	Absent		TS(7)
L2316797-01F	Glass 120ml/4oz unpreserved	A	NA		4.1	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316797-01G	Glass 250ml/8oz unpreserved	A	NA		4.1	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316797-01X	Vial MeOH preserved split	NA	NA			Y	Absent		NYTCL-8260HLW(14)
L2316797-02A	Vial MeOH preserved	A	NA		4.1	Y	Absent		NYTCL-8260HLW(14),NYTCL-8260H(14)
L2316797-02B	Vial water preserved	A	NA		4.1	Y	Absent	31-MAR-23 07:35	NYTCL-8260HLW(14),NYTCL-8260H(14)
L2316797-02C	Vial water preserved	A	NA		4.1	Y	Absent	31-MAR-23 07:35	NYTCL-8260HLW(14),NYTCL-8260H(14)
L2316797-02D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.1	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),NI-TI(180),TL-TI(180),CR-TI(180),PB-TI(180),SE-TI(180),ZN-TI(180),CU-TI(180),SB-TI(180),CO-TI(180),V-TI(180),FE-TI(180),MN-TI(180),MG-TI(180),HG-T(28),CD-TI(180),NA-TI(180),CA-TI(180),K-TI(180)
L2316797-02E	Plastic 120ml unpreserved	A	NA		4.1	Y	Absent		TS(7)
L2316797-02F	Glass 120ml/4oz unpreserved	A	NA		4.1	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316797-02G	Glass 120ml/4oz unpreserved	A	NA		4.1	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2316797-03A	Vial MeOH preserved	A	NA		4.1	Y	Absent		NYTCL-8260HLW(14)
L2316797-03B	Vial water preserved	A	NA		4.1	Y	Absent	31-MAR-23 07:35	NYTCL-8260HLW(14)

Project Name: 2731 W 12TH ST**Lab Number:** L2316797**Project Number:** 170697301**Report Date:** 04/06/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316797-03C	Vial water preserved	A	NA		4.1	Y	Absent	31-MAR-23 07:35	NYTCL-8260HLW(14)
L2316797-03D	Metals Only-Glass 60mL/2oz unpreserved	A	NA		4.1	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),NI-TI(180),AL-TI(180),CR-TI(180),TL-TI(180),ZN-TI(180),SB-TI(180),PB-TI(180),CU-TI(180),SE-TI(180),CO-TI(180),V-TI(180),MG-TI(180),HG-T(28),FE-TI(180),MN-TI(180),K-TI(180),CD-TI(180),NA-TI(180),CA-TI(180)
L2316797-03E	Plastic 120ml unpreserved	A	NA		4.1	Y	Absent		TS(7)
L2316797-03F	Glass 120ml/4oz unpreserved	A	NA		4.1	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2316797-03G	Glass 120ml/4oz unpreserved	A	NA		4.1	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2316797
Report Date: 04/06/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 107 Alpha Analytical - In-house calculation method.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 19

Published Date: 4/2/2021 1:14:23 PM

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Certification Information**The following analytes are not included in our Primary NELAP Scope of Accreditation:****Westborough Facility****EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B**The following analytes are included in our Massachusetts DEP Scope of Accreditation****Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

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ANALYTICAL REPORT

Lab Number:	L2317033
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Elizabeth Adkins
Phone:	(212) 479-5400
Project Name:	2731 W 12TH ST
Project Number:	170697301
Report Date:	04/10/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2317033-01	SB05_6-8	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/31/23 09:50	03/31/23
L2317033-02	SB05_8-10	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/31/23 10:00	03/31/23
L2317033-03	SB01_0-2	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/31/23 14:20	03/31/23
L2317033-04	SB01_9-11	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/31/23 11:55	03/31/23
L2317033-05	SB13_12-14	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/31/23 15:35	03/31/23
L2317033-06	SODUP02_033123	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/31/23 00:00	03/31/23
L2317033-07	TB02_033123	WATER	2731 W 12TH ST, BROOKLYN, NY	03/31/23 00:00	03/31/23
L2317033-08	SOFB02_033123	WATER	2731 W 12TH ST, BROOKLYN, NY	03/31/23 16:00	03/31/23
L2317033-09	SB03_2-4	SOIL	2731 W 12TH ST, BROOKLYN, NY	03/29/23 12:30	03/31/23

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Case Narrative (continued)

Report Submission

April 10, 2023: This final report includes the results of all requested analyses.

April 07, 2023: This is a preliminary report.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2317033-09: A sample identified as "SB03_2-4" was received, but not listed on the Chain of Custody. At the client's request, this sample was not analyzed.

Volatile Organics

L2317033-01: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (205%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2317033-02: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (133%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2317033-05: The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis. The results of both analyses are reported.

Semivolatile Organics

L2317033-01D: The surrogate recoveries are below the acceptance criteria for 2-fluorophenol (0%), phenol-d6 (0%), nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%), 2,4,6-tribromophenol (0%), and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Case Narrative (continued)

Total Metals

L2317033-01 through -04 and -06: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by the sample matrix.

The WG1762100-3/-4 MS/MSD recoveries for aluminum (0%/0%), calcium (0%/0%), iron (0%/0%), magnesium (0%/0%), and potassium (46%/60%), performed on L2317033-03, do not apply because the sample concentrations are greater than four times the spike amounts added. The MS/MSD RPD for calcium (39%) is above the acceptance criteria.

The WG1762100-3/-4 MS/MSD recoveries, performed on L2317033-03, are outside the acceptance criteria for manganese (48%/72%). A post digestion spike was performed and was within acceptance criteria.

Cyanide, Total

The WG1763456-2 LCS recovery for cyanide, total (79%), associated with L2317033-04 and -06, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

The WG1763459-2 LCS recovery for cyanide, total (79%), associated with L2317033-01 through -03, is outside our in-house acceptance criteria, but within the vendor-certified acceptance limits. The results of the original analyses are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Cristin Walker

Title: Technical Director/Representative

Date: 04/10/23

ORGANICS

VOLATILES

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-01
 Client ID: SB05_6-8
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/05/23 12:23
 Analyst: AJK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	320	150	1
1,1-Dichloroethane	ND		ug/kg	64	9.3	1
Chloroform	ND		ug/kg	96	9.0	1
Carbon tetrachloride	ND		ug/kg	64	15.	1
1,2-Dichloropropane	ND		ug/kg	64	8.0	1
Dibromochloromethane	ND		ug/kg	64	9.0	1
1,1,2-Trichloroethane	ND		ug/kg	64	17.	1
Tetrachloroethene	ND		ug/kg	32	12.	1
Chlorobenzene	ND		ug/kg	32	8.2	1
Trichlorofluoromethane	ND		ug/kg	260	45.	1
1,2-Dichloroethane	ND		ug/kg	64	16.	1
1,1,1-Trichloroethane	ND		ug/kg	32	11.	1
Bromodichloromethane	ND		ug/kg	32	7.0	1
trans-1,3-Dichloropropene	ND		ug/kg	64	18.	1
cis-1,3-Dichloropropene	ND		ug/kg	32	10.	1
1,3-Dichloropropene, Total	ND		ug/kg	32	10.	1
1,1-Dichloropropene	ND		ug/kg	32	10.	1
Bromoform	ND		ug/kg	260	16.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	32	11.	1
Benzene	4900		ug/kg	32	11.	1
Toluene	89000	E	ug/kg	64	35.	1
Ethylbenzene	67000	E	ug/kg	64	9.0	1
Chloromethane	ND		ug/kg	260	60.	1
Bromomethane	ND		ug/kg	130	37.	1
Vinyl chloride	ND		ug/kg	64	21.	1
Chloroethane	ND		ug/kg	130	29.	1
1,1-Dichloroethene	ND		ug/kg	64	15.	1
trans-1,2-Dichloroethene	ND		ug/kg	96	8.8	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-01

Date Collected: 03/31/23 09:50

Client ID: SB05_6-8

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	32	8.8	1
1,2-Dichlorobenzene	ND		ug/kg	130	9.2	1
1,3-Dichlorobenzene	ND		ug/kg	130	9.5	1
1,4-Dichlorobenzene	ND		ug/kg	130	11.	1
Methyl tert butyl ether	ND		ug/kg	130	13.	1
p/m-Xylene	180000	E	ug/kg	130	36.	1
o-Xylene	140000	E	ug/kg	64	19.	1
cis-1,2-Dichloroethene	ND		ug/kg	64	11.	1
1,2-Dichloroethene, Total	ND		ug/kg	64	8.8	1
Dibromomethane	ND		ug/kg	130	15.	1
Styrene	74000	E	ug/kg	64	12.	1
Dichlorodifluoromethane	ND		ug/kg	640	59.	1
Acetone	ND		ug/kg	640	310	1
Carbon disulfide	ND		ug/kg	640	290	1
2-Butanone	ND		ug/kg	640	140	1
Vinyl acetate	ND		ug/kg	640	140	1
4-Methyl-2-pentanone	ND		ug/kg	640	82.	1
1,2,3-Trichloropropane	ND		ug/kg	130	8.2	1
2-Hexanone	ND		ug/kg	640	76.	1
Bromochloromethane	ND		ug/kg	130	13.	1
2,2-Dichloropropane	ND		ug/kg	130	13.	1
1,2-Dibromoethane	ND		ug/kg	64	18.	1
1,3-Dichloropropane	ND		ug/kg	130	11.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	32	8.5	1
Bromobenzene	ND		ug/kg	130	9.3	1
n-Butylbenzene	15000		ug/kg	64	11.	1
sec-Butylbenzene	1600		ug/kg	64	9.4	1
tert-Butylbenzene	ND		ug/kg	130	7.6	1
o-Chlorotoluene	ND		ug/kg	130	12.	1
p-Chlorotoluene	ND		ug/kg	130	6.9	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	190	64.	1
Hexachlorobutadiene	ND		ug/kg	260	11.	1
Isopropylbenzene	20000	E	ug/kg	64	7.0	1
p-Isopropyltoluene	4200		ug/kg	64	7.0	1
Naphthalene	59000	E	ug/kg	260	42.	1
Acrylonitrile	ND		ug/kg	260	74.	1
n-Propylbenzene	23000	E	ug/kg	64	11.	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-01

Date Collected: 03/31/23 09:50

Client ID: SB05_6-8

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
1,2,3-Trichlorobenzene	ND		ug/kg	130	21.	1
1,2,4-Trichlorobenzene	ND		ug/kg	130	17.	1
1,3,5-Trimethylbenzene	42000	E	ug/kg	130	12.	1
1,2,4-Trimethylbenzene	56000	E	ug/kg	130	21.	1
1,4-Dioxane	ND		ug/kg	5100	2200	1
p-Diethylbenzene	49000	E	ug/kg	130	11.	1
p-Ethyltoluene	53000	E	ug/kg	130	25.	1
1,2,4,5-Tetramethylbenzene	15000		ug/kg	130	12.	1
Ethyl ether	ND		ug/kg	130	22.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	320	91.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	205	Q	70-130
Dibromofluoromethane	105		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-01 D2
 Client ID: SB05_6-8
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8260D

Analytical Date: 04/06/23 13:12

Analyst: AJK

Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab

Naphthalene	4500000		ug/kg	130000	21000	500
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	108		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-01 D
 Client ID: SB05_6-8
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/06/23 00:15
 Analyst: JIC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Toluene	170000		ug/kg	6400	3500	100
Ethylbenzene	570000		ug/kg	6400	900	100
p/m-Xylene	990000		ug/kg	13000	3600	100
o-Xylene	510000		ug/kg	6400	1900	100
Xylenes, Total	1500000		ug/kg	6400	1900	100
Styrene	360000		ug/kg	6400	1200	100
Isopropylbenzene	27000		ug/kg	6400	700	100
n-Propylbenzene	36000		ug/kg	6400	1100	100
1,3,5-Trimethylbenzene	160000		ug/kg	13000	1200	100
1,2,4-Trimethylbenzene	520000		ug/kg	13000	2100	100
p-Diethylbenzene	83000		ug/kg	13000	1100	100
p-Ethyltoluene	390000		ug/kg	13000	2500	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	106		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02
 Client ID: SB05_8-10
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/05/23 12:43
 Analyst: AJK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	320	150	1
1,1-Dichloroethane	ND		ug/kg	65	9.4	1
Chloroform	ND		ug/kg	97	9.1	1
Carbon tetrachloride	ND		ug/kg	65	15.	1
1,2-Dichloropropane	ND		ug/kg	65	8.1	1
Dibromochloromethane	ND		ug/kg	65	9.1	1
1,1,2-Trichloroethane	ND		ug/kg	65	17.	1
Tetrachloroethene	ND		ug/kg	32	13.	1
Chlorobenzene	ND		ug/kg	32	8.2	1
Trichlorofluoromethane	ND		ug/kg	260	45.	1
1,2-Dichloroethane	ND		ug/kg	65	17.	1
1,1,1-Trichloroethane	ND		ug/kg	32	11.	1
Bromodichloromethane	ND		ug/kg	32	7.1	1
trans-1,3-Dichloropropene	ND		ug/kg	65	18.	1
cis-1,3-Dichloropropene	ND		ug/kg	32	10.	1
1,3-Dichloropropene, Total	ND		ug/kg	32	10.	1
1,1-Dichloropropene	ND		ug/kg	32	10.	1
Bromoform	ND		ug/kg	260	16.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	32	11.	1
Benzene	4200		ug/kg	32	11.	1
Toluene	78000	E	ug/kg	65	35.	1
Ethylbenzene	55000	E	ug/kg	65	9.2	1
Chloromethane	ND		ug/kg	260	60.	1
Bromomethane	ND		ug/kg	130	38.	1
Vinyl chloride	ND		ug/kg	65	22.	1
Chloroethane	ND		ug/kg	130	29.	1
1,1-Dichloroethene	ND		ug/kg	65	15.	1
trans-1,2-Dichloroethene	ND		ug/kg	97	8.9	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-02**Date Collected:** 03/31/23 10:00**Client ID:** SB05_8-10**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	20	J	ug/kg	32	8.9	1
1,2-Dichlorobenzene	ND		ug/kg	130	9.4	1
1,3-Dichlorobenzene	ND		ug/kg	130	9.6	1
1,4-Dichlorobenzene	ND		ug/kg	130	11.	1
Methyl tert butyl ether	ND		ug/kg	130	13.	1
p/m-Xylene	140000	E	ug/kg	130	36.	1
o-Xylene	120000	E	ug/kg	65	19.	1
cis-1,2-Dichloroethene	ND		ug/kg	65	11.	1
1,2-Dichloroethene, Total	ND		ug/kg	65	8.9	1
Dibromomethane	ND		ug/kg	130	15.	1
Styrene	62000	E	ug/kg	65	13.	1
Dichlorodifluoromethane	ND		ug/kg	650	59.	1
Acetone	ND		ug/kg	650	310	1
Carbon disulfide	ND		ug/kg	650	300	1
2-Butanone	ND		ug/kg	650	140	1
Vinyl acetate	ND		ug/kg	650	140	1
4-Methyl-2-pentanone	ND		ug/kg	650	83.	1
1,2,3-Trichloropropane	ND		ug/kg	130	8.2	1
2-Hexanone	ND		ug/kg	650	77.	1
Bromochloromethane	ND		ug/kg	130	13.	1
2,2-Dichloropropane	ND		ug/kg	130	13.	1
1,2-Dibromoethane	ND		ug/kg	65	18.	1
1,3-Dichloropropane	ND		ug/kg	130	11.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	32	8.6	1
Bromobenzene	ND		ug/kg	130	9.4	1
n-Butylbenzene	10000		ug/kg	65	11.	1
sec-Butylbenzene	1200		ug/kg	65	9.5	1
tert-Butylbenzene	ND		ug/kg	130	7.7	1
o-Chlorotoluene	ND		ug/kg	130	12.	1
p-Chlorotoluene	ND		ug/kg	130	7.0	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	190	65.	1
Hexachlorobutadiene	ND		ug/kg	260	11.	1
Isopropylbenzene	14000		ug/kg	65	7.1	1
p-Isopropyltoluene	3200		ug/kg	65	7.1	1
Naphthalene	63000	E	ug/kg	260	42.	1
Acrylonitrile	ND		ug/kg	260	75.	1
n-Propylbenzene	18000		ug/kg	65	11.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-02**Date Collected:** 03/31/23 10:00**Client ID:** SB05_8-10**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
1,2,3-Trichlorobenzene	ND		ug/kg	130	21.	1
1,2,4-Trichlorobenzene	ND		ug/kg	130	18.	1
1,3,5-Trimethylbenzene	36000	E	ug/kg	130	12.	1
1,2,4-Trimethylbenzene	48000	E	ug/kg	130	22.	1
1,4-Dioxane	ND		ug/kg	5200	2300	1
p-Diethylbenzene	38000	E	ug/kg	130	11.	1
p-Ethyltoluene	45000	E	ug/kg	130	25.	1
1,2,4,5-Tetramethylbenzene	14000		ug/kg	130	12.	1
Ethyl ether	ND		ug/kg	130	22.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	320	92.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	133	Q	70-130
Dibromofluoromethane	104		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02 D2
 Client ID: SB05_8-10
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Analytical Method: 1,8260D

Analytical Date: 04/06/23 13:32

Analyst: MKS

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab

Naphthalene	3000000		ug/kg	130000	21000	500
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	106		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02 D
 Client ID: SB05_8-10
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/06/23 00:35
 Analyst: JIC
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Toluene	170000		ug/kg	6500	3500	100
Ethylbenzene	490000		ug/kg	6500	920	100
p/m-Xylene	840000		ug/kg	13000	3600	100
o-Xylene	420000		ug/kg	6500	1900	100
Xylenes, Total	1300000		ug/kg	6500	1900	100
Styrene	310000		ug/kg	6500	1300	100
1,3,5-Trimethylbenzene	120000		ug/kg	13000	1200	100
1,2,4-Trimethylbenzene	390000		ug/kg	13000	2200	100
p-Diethylbenzene	60000		ug/kg	13000	1100	100
p-Ethyltoluene	300000		ug/kg	13000	2500	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	88		70-130
Dibromofluoromethane	105		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-03
 Client ID: SB01_0-2
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 14:20
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/06/23 12:52
 Analyst: AJK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	5.7	2.6	1
1,1-Dichloroethane	ND		ug/kg	1.1	0.17	1
Chloroform	ND		ug/kg	1.7	0.16	1
Carbon tetrachloride	ND		ug/kg	1.1	0.26	1
1,2-Dichloropropane	ND		ug/kg	1.1	0.14	1
Dibromochloromethane	ND		ug/kg	1.1	0.16	1
1,1,2-Trichloroethane	ND		ug/kg	1.1	0.31	1
Tetrachloroethene	ND		ug/kg	0.57	0.22	1
Chlorobenzene	ND		ug/kg	0.57	0.14	1
Trichlorofluoromethane	ND		ug/kg	4.6	0.80	1
1,2-Dichloroethane	ND		ug/kg	1.1	0.29	1
1,1,1-Trichloroethane	ND		ug/kg	0.57	0.19	1
Bromodichloromethane	ND		ug/kg	0.57	0.12	1
trans-1,3-Dichloropropene	ND		ug/kg	1.1	0.31	1
cis-1,3-Dichloropropene	ND		ug/kg	0.57	0.18	1
1,3-Dichloropropene, Total	ND		ug/kg	0.57	0.18	1
1,1-Dichloropropene	ND		ug/kg	0.57	0.18	1
Bromoform	ND		ug/kg	4.6	0.28	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.57	0.19	1
Benzene	ND		ug/kg	0.57	0.19	1
Toluene	ND		ug/kg	1.1	0.62	1
Ethylbenzene	0.21	J	ug/kg	1.1	0.16	1
Chloromethane	ND		ug/kg	4.6	1.1	1
Bromomethane	ND		ug/kg	2.3	0.67	1
Vinyl chloride	ND		ug/kg	1.1	0.38	1
Chloroethane	ND		ug/kg	2.3	0.52	1
1,1-Dichloroethene	ND		ug/kg	1.1	0.27	1
trans-1,2-Dichloroethene	ND		ug/kg	1.7	0.16	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-03

Date Collected: 03/31/23 14:20

Client ID: SB01_0-2

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.57	0.16	1
1,2-Dichlorobenzene	ND		ug/kg	2.3	0.16	1
1,3-Dichlorobenzene	ND		ug/kg	2.3	0.17	1
1,4-Dichlorobenzene	ND		ug/kg	2.3	0.20	1
Methyl tert butyl ether	ND		ug/kg	2.3	0.23	1
p/m-Xylene	ND		ug/kg	2.3	0.64	1
o-Xylene	ND		ug/kg	1.1	0.33	1
Xylenes, Total	ND		ug/kg	1.1	0.33	1
cis-1,2-Dichloroethene	ND		ug/kg	1.1	0.20	1
1,2-Dichloroethene, Total	ND		ug/kg	1.1	0.16	1
Dibromomethane	ND		ug/kg	2.3	0.27	1
Styrene	ND		ug/kg	1.1	0.22	1
Dichlorodifluoromethane	ND		ug/kg	11	1.0	1
Acetone	ND		ug/kg	11	5.5	1
Carbon disulfide	ND		ug/kg	11	5.2	1
2-Butanone	ND		ug/kg	11	2.5	1
Vinyl acetate	ND		ug/kg	11	2.5	1
4-Methyl-2-pentanone	ND		ug/kg	11	1.5	1
1,2,3-Trichloropropane	ND		ug/kg	2.3	0.14	1
2-Hexanone	ND		ug/kg	11	1.4	1
Bromochloromethane	ND		ug/kg	2.3	0.24	1
2,2-Dichloropropane	ND		ug/kg	2.3	0.23	1
1,2-Dibromoethane	ND		ug/kg	1.1	0.32	1
1,3-Dichloropropane	ND		ug/kg	2.3	0.19	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.57	0.15	1
Bromobenzene	ND		ug/kg	2.3	0.17	1
n-Butylbenzene	ND		ug/kg	1.1	0.19	1
sec-Butylbenzene	ND		ug/kg	1.1	0.17	1
tert-Butylbenzene	ND		ug/kg	2.3	0.14	1
o-Chlorotoluene	ND		ug/kg	2.3	0.22	1
p-Chlorotoluene	ND		ug/kg	2.3	0.12	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.4	1.1	1
Hexachlorobutadiene	ND		ug/kg	4.6	0.19	1
Isopropylbenzene	ND		ug/kg	1.1	0.12	1
p-Isopropyltoluene	ND		ug/kg	1.1	0.12	1
Naphthalene	1.2	J	ug/kg	4.6	0.74	1
Acrylonitrile	ND		ug/kg	4.6	1.3	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-03**Date Collected:** 03/31/23 14:20**Client ID:** SB01_0-2**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	ND		ug/kg	1.1	0.20	1
1,2,3-Trichlorobenzene	ND		ug/kg	2.3	0.37	1
1,2,4-Trichlorobenzene	ND		ug/kg	2.3	0.31	1
1,3,5-Trimethylbenzene	ND		ug/kg	2.3	0.22	1
1,2,4-Trimethylbenzene	ND		ug/kg	2.3	0.38	1
1,4-Dioxane	ND		ug/kg	92	40.	1
p-Diethylbenzene	ND		ug/kg	2.3	0.20	1
p-Ethyltoluene	ND		ug/kg	2.3	0.44	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.3	0.22	1
Ethyl ether	ND		ug/kg	2.3	0.39	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.7	1.6	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	111		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-04
 Client ID: SB01_9-11
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 11:55
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/06/23 01:14
 Analyst: JIC
 Percent Solids: 61%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	660	300	1
1,1-Dichloroethane	ND		ug/kg	130	19.	1
Chloroform	ND		ug/kg	200	18.	1
Carbon tetrachloride	ND		ug/kg	130	30.	1
1,2-Dichloropropane	ND		ug/kg	130	16.	1
Dibromochloromethane	ND		ug/kg	130	18.	1
1,1,2-Trichloroethane	ND		ug/kg	130	35.	1
Tetrachloroethene	ND		ug/kg	66	26.	1
Chlorobenzene	ND		ug/kg	66	17.	1
Trichlorofluoromethane	ND		ug/kg	530	92.	1
1,2-Dichloroethane	ND		ug/kg	130	34.	1
1,1,1-Trichloroethane	ND		ug/kg	66	22.	1
Bromodichloromethane	ND		ug/kg	66	14.	1
trans-1,3-Dichloropropene	ND		ug/kg	130	36.	1
cis-1,3-Dichloropropene	ND		ug/kg	66	21.	1
1,3-Dichloropropene, Total	ND		ug/kg	66	21.	1
1,1-Dichloropropene	ND		ug/kg	66	21.	1
Bromoform	ND		ug/kg	530	32.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	66	22.	1
Benzene	7100		ug/kg	66	22.	1
Toluene	220		ug/kg	130	72.	1
Ethylbenzene	13000		ug/kg	130	19.	1
Chloromethane	ND		ug/kg	530	120	1
Bromomethane	ND		ug/kg	260	77.	1
Vinyl chloride	ND		ug/kg	130	44.	1
Chloroethane	ND		ug/kg	260	60.	1
1,1-Dichloroethene	ND		ug/kg	130	31.	1
trans-1,2-Dichloroethene	ND		ug/kg	200	18.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-04**Date Collected:** 03/31/23 11:55**Client ID:** SB01_9-11**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	66	18.	1
1,2-Dichlorobenzene	ND		ug/kg	260	19.	1
1,3-Dichlorobenzene	ND		ug/kg	260	20.	1
1,4-Dichlorobenzene	ND		ug/kg	260	22.	1
Methyl tert butyl ether	ND		ug/kg	260	26.	1
p/m-Xylene	11000		ug/kg	260	74.	1
o-Xylene	6400		ug/kg	130	38.	1
Xylenes, Total	17000		ug/kg	130	38.	1
cis-1,2-Dichloroethene	ND		ug/kg	130	23.	1
1,2-Dichloroethene, Total	ND		ug/kg	130	18.	1
Dibromomethane	ND		ug/kg	260	31.	1
Styrene	ND		ug/kg	130	26.	1
Dichlorodifluoromethane	ND		ug/kg	1300	120	1
Acetone	ND		ug/kg	1300	640	1
Carbon disulfide	ND		ug/kg	1300	600	1
2-Butanone	ND		ug/kg	1300	290	1
Vinyl acetate	ND		ug/kg	1300	280	1
4-Methyl-2-pentanone	ND		ug/kg	1300	170	1
1,2,3-Trichloropropane	ND		ug/kg	260	17.	1
2-Hexanone	ND		ug/kg	1300	160	1
Bromochloromethane	ND		ug/kg	260	27.	1
2,2-Dichloropropane	ND		ug/kg	260	27.	1
1,2-Dibromoethane	ND		ug/kg	130	37.	1
1,3-Dichloropropane	ND		ug/kg	260	22.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	66	17.	1
Bromobenzene	ND		ug/kg	260	19.	1
n-Butylbenzene	ND		ug/kg	130	22.	1
sec-Butylbenzene	ND		ug/kg	130	19.	1
tert-Butylbenzene	ND		ug/kg	260	16.	1
o-Chlorotoluene	ND		ug/kg	260	25.	1
p-Chlorotoluene	ND		ug/kg	260	14.	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	400	130	1
Hexachlorobutadiene	ND		ug/kg	530	22.	1
Isopropylbenzene	560		ug/kg	130	14.	1
p-Isopropyltoluene	16	J	ug/kg	130	14.	1
Naphthalene	890		ug/kg	530	86.	1
Acrylonitrile	ND		ug/kg	530	150	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-04**Date Collected:** 03/31/23 11:55**Client ID:** SB01_9-11**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	32	J	ug/kg	130	22.	1
1,2,3-Trichlorobenzene	ND		ug/kg	260	42.	1
1,2,4-Trichlorobenzene	ND		ug/kg	260	36.	1
1,3,5-Trimethylbenzene	230	J	ug/kg	260	25.	1
1,2,4-Trimethylbenzene	640		ug/kg	260	44.	1
1,4-Dioxane	ND		ug/kg	10000	4600	1
p-Diethylbenzene	ND		ug/kg	260	23.	1
p-Ethyltoluene	1100		ug/kg	260	51.	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	260	25.	1
Ethyl ether	ND		ug/kg	260	45.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	660	190	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-05
 Client ID: SB13_12-14
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 15:35
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/06/23 01:34
 Analyst: JIC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	300	140	1
1,1-Dichloroethane	ND		ug/kg	60	8.7	1
Chloroform	ND		ug/kg	90	8.4	1
Carbon tetrachloride	ND		ug/kg	60	14.	1
1,2-Dichloropropane	ND		ug/kg	60	7.5	1
Dibromochloromethane	ND		ug/kg	60	8.4	1
1,1,2-Trichloroethane	ND		ug/kg	60	16.	1
Tetrachloroethene	ND		ug/kg	30	12.	1
Chlorobenzene	ND		ug/kg	30	7.6	1
Trichlorofluoromethane	ND		ug/kg	240	42.	1
1,2-Dichloroethane	ND		ug/kg	60	15.	1
1,1,1-Trichloroethane	ND		ug/kg	30	10.	1
Bromodichloromethane	ND		ug/kg	30	6.6	1
trans-1,3-Dichloropropene	ND		ug/kg	60	16.	1
cis-1,3-Dichloropropene	ND		ug/kg	30	9.5	1
1,3-Dichloropropene, Total	ND		ug/kg	30	9.5	1
1,1-Dichloropropene	ND		ug/kg	30	9.6	1
Bromoform	ND		ug/kg	240	15.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	30	10.	1
Benzene	89		ug/kg	30	10.	1
Toluene	ND		ug/kg	60	33.	1
Ethylbenzene	68		ug/kg	60	8.5	1
Chloromethane	ND		ug/kg	240	56.	1
Bromomethane	ND		ug/kg	120	35.	1
Vinyl chloride	ND		ug/kg	60	20.	1
Chloroethane	ND		ug/kg	120	27.	1
1,1-Dichloroethene	ND		ug/kg	60	14.	1
trans-1,2-Dichloroethene	ND		ug/kg	90	8.2	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-05**Date Collected:** 03/31/23 15:35**Client ID:** SB13_12-14**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	30	8.2	1
1,2-Dichlorobenzene	ND		ug/kg	120	8.7	1
1,3-Dichlorobenzene	ND		ug/kg	120	8.9	1
1,4-Dichlorobenzene	ND		ug/kg	120	10.	1
Methyl tert butyl ether	ND		ug/kg	120	12.	1
p/m-Xylene	44	J	ug/kg	120	34.	1
o-Xylene	27	J	ug/kg	60	18.	1
Xylenes, Total	71	J	ug/kg	60	18.	1
cis-1,2-Dichloroethene	ND		ug/kg	60	10.	1
1,2-Dichloroethene, Total	ND		ug/kg	60	8.2	1
Dibromomethane	ND		ug/kg	120	14.	1
Styrene	ND		ug/kg	60	12.	1
Dichlorodifluoromethane	ND		ug/kg	600	55.	1
Acetone	ND		ug/kg	600	290	1
Carbon disulfide	ND		ug/kg	600	270	1
2-Butanone	ND		ug/kg	600	130	1
Vinyl acetate	ND		ug/kg	600	130	1
4-Methyl-2-pentanone	ND		ug/kg	600	77.	1
1,2,3-Trichloropropane	ND		ug/kg	120	7.6	1
2-Hexanone	ND		ug/kg	600	71.	1
Bromochloromethane	ND		ug/kg	120	12.	1
2,2-Dichloropropane	ND		ug/kg	120	12.	1
1,2-Dibromoethane	ND		ug/kg	60	17.	1
1,3-Dichloropropane	ND		ug/kg	120	10.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	30	8.0	1
Bromobenzene	ND		ug/kg	120	8.7	1
n-Butylbenzene	ND		ug/kg	60	10.	1
sec-Butylbenzene	ND		ug/kg	60	8.8	1
tert-Butylbenzene	ND		ug/kg	120	7.1	1
o-Chlorotoluene	ND		ug/kg	120	12.	1
p-Chlorotoluene	ND		ug/kg	120	6.5	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	180	60.	1
Hexachlorobutadiene	ND		ug/kg	240	10.	1
Isopropylbenzene	16	J	ug/kg	60	6.6	1
p-Isopropyltoluene	ND		ug/kg	60	6.6	1
Naphthalene	720		ug/kg	240	39.	1
Acrylonitrile	ND		ug/kg	240	69.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-05**Date Collected:** 03/31/23 15:35**Client ID:** SB13_12-14**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	ND		ug/kg	60	10.	1
1,2,3-Trichlorobenzene	ND		ug/kg	120	19.	1
1,2,4-Trichlorobenzene	ND		ug/kg	120	16.	1
1,3,5-Trimethylbenzene	ND		ug/kg	120	12.	1
1,2,4-Trimethylbenzene	45	J	ug/kg	120	20.	1
1,4-Dioxane	ND		ug/kg	4800	2100	1
p-Diethylbenzene	ND		ug/kg	120	11.	1
p-Ethyltoluene	ND		ug/kg	120	23.	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	120	12.	1
Ethyl ether	ND		ug/kg	120	20.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	300	86.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	105		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-05
 Client ID: SB13_12-14
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 15:35
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/07/23 02:56
 Analyst: JIC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methylene chloride	ND		ug/kg	5.2	2.4	1
1,1-Dichloroethane	ND		ug/kg	1.0	0.15	1
Chloroform	ND		ug/kg	1.6	0.14	1
Carbon tetrachloride	ND		ug/kg	1.0	0.24	1
1,2-Dichloropropane	ND		ug/kg	1.0	0.13	1
Dibromochloromethane	ND		ug/kg	1.0	0.14	1
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.28	1
Tetrachloroethene	ND		ug/kg	0.52	0.20	1
Chlorobenzene	ND		ug/kg	0.52	0.13	1
Trichlorofluoromethane	ND		ug/kg	4.2	0.72	1
1,2-Dichloroethane	ND		ug/kg	1.0	0.27	1
1,1,1-Trichloroethane	ND		ug/kg	0.52	0.17	1
Bromodichloromethane	ND		ug/kg	0.52	0.11	1
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.28	1
cis-1,3-Dichloropropene	ND		ug/kg	0.52	0.16	1
1,3-Dichloropropene, Total	ND		ug/kg	0.52	0.16	1
1,1-Dichloropropene	ND		ug/kg	0.52	0.16	1
Bromoform	ND		ug/kg	4.2	0.26	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.52	0.17	1
Benzene	72		ug/kg	0.52	0.17	1
Toluene	2.5		ug/kg	1.0	0.56	1
Ethylbenzene	32		ug/kg	1.0	0.15	1
Chloromethane	ND		ug/kg	4.2	0.97	1
Bromomethane	ND		ug/kg	2.1	0.60	1
Vinyl chloride	ND		ug/kg	1.0	0.35	1
Chloroethane	ND		ug/kg	2.1	0.47	1
1,1-Dichloroethene	ND		ug/kg	1.0	0.25	1
trans-1,2-Dichloroethene	ND		ug/kg	1.6	0.14	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-05**Date Collected:** 03/31/23 15:35**Client ID:** SB13_12-14**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Trichloroethene	ND		ug/kg	0.52	0.14	1
1,2-Dichlorobenzene	ND		ug/kg	2.1	0.15	1
1,3-Dichlorobenzene	ND		ug/kg	2.1	0.15	1
1,4-Dichlorobenzene	ND		ug/kg	2.1	0.18	1
Methyl tert butyl ether	ND		ug/kg	2.1	0.21	1
p/m-Xylene	14		ug/kg	2.1	0.58	1
o-Xylene	15		ug/kg	1.0	0.30	1
Xylenes, Total	29		ug/kg	1.0	0.30	1
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18	1
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14	1
Dibromomethane	ND		ug/kg	2.1	0.25	1
Styrene	1.1		ug/kg	1.0	0.20	1
Dichlorodifluoromethane	ND		ug/kg	10	0.95	1
Acetone	9.6	J	ug/kg	10	5.0	1
Carbon disulfide	18		ug/kg	10	4.7	1
2-Butanone	ND		ug/kg	10	2.3	1
Vinyl acetate	ND		ug/kg	10	2.2	1
4-Methyl-2-pentanone	ND		ug/kg	10	1.3	1
1,2,3-Trichloropropane	ND		ug/kg	2.1	0.13	1
2-Hexanone	ND		ug/kg	10	1.2	1
Bromochloromethane	ND		ug/kg	2.1	0.21	1
2,2-Dichloropropane	ND		ug/kg	2.1	0.21	1
1,2-Dibromoethane	ND		ug/kg	1.0	0.29	1
1,3-Dichloropropane	ND		ug/kg	2.1	0.17	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.52	0.14	1
Bromobenzene	ND		ug/kg	2.1	0.15	1
n-Butylbenzene	ND		ug/kg	1.0	0.17	1
sec-Butylbenzene	ND		ug/kg	1.0	0.15	1
tert-Butylbenzene	ND		ug/kg	2.1	0.12	1
o-Chlorotoluene	ND		ug/kg	2.1	0.20	1
p-Chlorotoluene	ND		ug/kg	2.1	0.11	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.1	1.0	1
Hexachlorobutadiene	ND		ug/kg	4.2	0.18	1
Isopropylbenzene	12		ug/kg	1.0	0.11	1
p-Isopropyltoluene	0.97	J	ug/kg	1.0	0.11	1
Naphthalene	460	E	ug/kg	4.2	0.68	1
Acrylonitrile	ND		ug/kg	4.2	1.2	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-05**Date Collected:** 03/31/23 15:35**Client ID:** SB13_12-14**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
n-Propylbenzene	4.4		ug/kg	1.0	0.18	1
1,2,3-Trichlorobenzene	ND		ug/kg	2.1	0.33	1
1,2,4-Trichlorobenzene	ND		ug/kg	2.1	0.28	1
1,3,5-Trimethylbenzene	5.1		ug/kg	2.1	0.20	1
1,2,4-Trimethylbenzene	32		ug/kg	2.1	0.35	1
1,4-Dioxane	ND		ug/kg	83	36.	1
p-Diethylbenzene	0.97	J	ug/kg	2.1	0.18	1
p-Ethyltoluene	9.6		ug/kg	2.1	0.40	1
1,2,4,5-Tetramethylbenzene	2.4		ug/kg	2.1	0.20	1
Ethyl ether	ND		ug/kg	2.1	0.35	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.2	1.5	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-06
 Client ID: SODUP02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 00:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 04/06/23 12:33
 Analyst: AJK
 Percent Solids: 65%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methylene chloride	ND		ug/kg	650	300	1
1,1-Dichloroethane	ND		ug/kg	130	19.	1
Chloroform	ND		ug/kg	190	18.	1
Carbon tetrachloride	ND		ug/kg	130	30.	1
1,2-Dichloropropane	ND		ug/kg	130	16.	1
Dibromochloromethane	ND		ug/kg	130	18.	1
1,1,2-Trichloroethane	ND		ug/kg	130	34.	1
Tetrachloroethene	ND		ug/kg	65	25.	1
Chlorobenzene	ND		ug/kg	65	16.	1
Trichlorofluoromethane	ND		ug/kg	520	90.	1
1,2-Dichloroethane	ND		ug/kg	130	33.	1
1,1,1-Trichloroethane	ND		ug/kg	65	22.	1
Bromodichloromethane	ND		ug/kg	65	14.	1
trans-1,3-Dichloropropene	ND		ug/kg	130	35.	1
cis-1,3-Dichloropropene	ND		ug/kg	65	20.	1
1,3-Dichloropropene, Total	ND		ug/kg	65	20.	1
1,1-Dichloropropene	ND		ug/kg	65	20.	1
Bromoform	ND		ug/kg	520	32.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	65	21.	1
Benzene	6100		ug/kg	65	21.	1
Toluene	220		ug/kg	130	70.	1
Ethylbenzene	13000		ug/kg	130	18.	1
Chloromethane	ND		ug/kg	520	120	1
Bromomethane	ND		ug/kg	260	75.	1
Vinyl chloride	ND		ug/kg	130	43.	1
Chloroethane	ND		ug/kg	260	58.	1
1,1-Dichloroethene	ND		ug/kg	130	31.	1
trans-1,2-Dichloroethene	ND		ug/kg	190	18.	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-06
 Client ID: SODUP02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 00:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Trichloroethene	ND		ug/kg	65	18.	1
1,2-Dichlorobenzene	ND		ug/kg	260	19.	1
1,3-Dichlorobenzene	ND		ug/kg	260	19.	1
1,4-Dichlorobenzene	ND		ug/kg	260	22.	1
Methyl tert butyl ether	ND		ug/kg	260	26.	1
p/m-Xylene	11000		ug/kg	260	72.	1
o-Xylene	6600		ug/kg	130	38.	1
Xylenes, Total	18000		ug/kg	130	38.	1
cis-1,2-Dichloroethene	ND		ug/kg	130	23.	1
1,2-Dichloroethene, Total	ND		ug/kg	130	18.	1
Dibromomethane	ND		ug/kg	260	31.	1
Styrene	ND		ug/kg	130	25.	1
Dichlorodifluoromethane	ND		ug/kg	1300	120	1
Acetone	ND		ug/kg	1300	620	1
Carbon disulfide	ND		ug/kg	1300	590	1
2-Butanone	ND		ug/kg	1300	290	1
Vinyl acetate	ND		ug/kg	1300	280	1
4-Methyl-2-pentanone	ND		ug/kg	1300	160	1
1,2,3-Trichloropropane	ND		ug/kg	260	16.	1
2-Hexanone	ND		ug/kg	1300	150	1
Bromochloromethane	ND		ug/kg	260	26.	1
2,2-Dichloropropane	ND		ug/kg	260	26.	1
1,2-Dibromoethane	ND		ug/kg	130	36.	1
1,3-Dichloropropane	ND		ug/kg	260	22.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	65	17.	1
Bromobenzene	ND		ug/kg	260	19.	1
n-Butylbenzene	ND		ug/kg	130	22.	1
sec-Butylbenzene	ND		ug/kg	130	19.	1
tert-Butylbenzene	ND		ug/kg	260	15.	1
o-Chlorotoluene	ND		ug/kg	260	25.	1
p-Chlorotoluene	ND		ug/kg	260	14.	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	390	130	1
Hexachlorobutadiene	ND		ug/kg	520	22.	1
Isopropylbenzene	590		ug/kg	130	14.	1
p-Isopropyltoluene	17	J	ug/kg	130	14.	1
Naphthalene	570		ug/kg	520	84.	1
Acrylonitrile	ND		ug/kg	520	150	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-06**Date Collected:** 03/31/23 00:00**Client ID:** SODUP02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
n-Propylbenzene	30	J	ug/kg	130	22.	1
1,2,3-Trichlorobenzene	ND		ug/kg	260	42.	1
1,2,4-Trichlorobenzene	ND		ug/kg	260	35.	1
1,3,5-Trimethylbenzene	250	J	ug/kg	260	25.	1
1,2,4-Trimethylbenzene	690		ug/kg	260	43.	1
1,4-Dioxane	ND		ug/kg	10000	4500	1
p-Diethylbenzene	ND		ug/kg	260	23.	1
p-Ethyltoluene	1100		ug/kg	260	50.	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	260	25.	1
Ethyl ether	ND		ug/kg	260	44.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	650	180	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	107		70-130

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-07
 Client ID: TB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 00:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 04/03/23 15:12
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-07

Date Collected: 03/31/23 00:00

Client ID: TB02_033123

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	ND		ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-07

Date Collected: 03/31/23 00:00

Client ID: TB02_033123

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	115		70-130

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-08
 Client ID: SOFB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 04/03/23 15:37
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-08**Date Collected:** 03/31/23 16:00**Client ID:** SOFB02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	ND		ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-08**Date Collected:** 03/31/23 16:00**Client ID:** SOFB02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	115		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 08:35
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07-08 Batch: WG1762444-5					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.14
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.07
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.17
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.18

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/03/23 08:35
 Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07-08 Batch: WG1762444-5					
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.5
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.9
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/03/23 08:35
Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07-08 Batch: WG1762444-5					
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
1,4-Dioxane	ND		ug/l	250	61.
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	112		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02 Batch: WG1763068-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 08:39
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02 Batch: WG1763068-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/05/23 08:39
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02 Batch: WG1763068-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	ND		ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	106		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 18:41
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,04-05 Batch: WG1763422-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	7.6	J	ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 18:41
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,04-05 Batch: WG1763422-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	17	J	ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/05/23 18:41
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,04-05 Batch: WG1763422-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	160	J	ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	106		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 08:30
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,06 Batch: WG1763653-5					
Methylene chloride	ND		ug/kg	250	110
1,1-Dichloroethane	ND		ug/kg	50	7.2
Chloroform	ND		ug/kg	75	7.0
Carbon tetrachloride	ND		ug/kg	50	12.
1,2-Dichloropropane	ND		ug/kg	50	6.2
Dibromochloromethane	ND		ug/kg	50	7.0
1,1,2-Trichloroethane	ND		ug/kg	50	13.
Tetrachloroethene	ND		ug/kg	25	9.8
Chlorobenzene	ND		ug/kg	25	6.4
Trichlorofluoromethane	ND		ug/kg	200	35.
1,2-Dichloroethane	ND		ug/kg	50	13.
1,1,1-Trichloroethane	ND		ug/kg	25	8.4
Bromodichloromethane	ND		ug/kg	25	5.4
trans-1,3-Dichloropropene	ND		ug/kg	50	14.
cis-1,3-Dichloropropene	ND		ug/kg	25	7.9
1,3-Dichloropropene, Total	ND		ug/kg	25	7.9
1,1-Dichloropropene	ND		ug/kg	25	8.0
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	25	8.3
Benzene	ND		ug/kg	25	8.3
Toluene	ND		ug/kg	50	27.
Ethylbenzene	ND		ug/kg	50	7.0
Chloromethane	ND		ug/kg	200	47.
Bromomethane	ND		ug/kg	100	29.
Vinyl chloride	ND		ug/kg	50	17.
Chloroethane	ND		ug/kg	100	23.
1,1-Dichloroethene	ND		ug/kg	50	12.
trans-1,2-Dichloroethene	ND		ug/kg	75	6.8
Trichloroethene	ND		ug/kg	25	6.8

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
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Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 08:30
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,06 Batch: WG1763653-5					
1,2-Dichlorobenzene	ND		ug/kg	100	7.2
1,3-Dichlorobenzene	ND		ug/kg	100	7.4
1,4-Dichlorobenzene	ND		ug/kg	100	8.6
Methyl tert butyl ether	ND		ug/kg	100	10.
p/m-Xylene	ND		ug/kg	100	28.
o-Xylene	ND		ug/kg	50	14.
Xylenes, Total	ND		ug/kg	50	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	8.8
1,2-Dichloroethene, Total	ND		ug/kg	50	6.8
Dibromomethane	ND		ug/kg	100	12.
Styrene	ND		ug/kg	50	9.8
Dichlorodifluoromethane	ND		ug/kg	500	46.
Acetone	ND		ug/kg	500	240
Carbon disulfide	ND		ug/kg	500	230
2-Butanone	ND		ug/kg	500	110
Vinyl acetate	ND		ug/kg	500	110
4-Methyl-2-pentanone	ND		ug/kg	500	64.
1,2,3-Trichloropropane	ND		ug/kg	100	6.4
2-Hexanone	ND		ug/kg	500	59.
Bromochloromethane	ND		ug/kg	100	10.
2,2-Dichloropropane	ND		ug/kg	100	10.
1,2-Dibromoethane	ND		ug/kg	50	14.
1,3-Dichloropropane	ND		ug/kg	100	8.4
1,1,1,2-Tetrachloroethane	ND		ug/kg	25	6.6
Bromobenzene	ND		ug/kg	100	7.2
n-Butylbenzene	ND		ug/kg	50	8.4
sec-Butylbenzene	ND		ug/kg	50	7.3
tert-Butylbenzene	ND		ug/kg	100	5.9
o-Chlorotoluene	ND		ug/kg	100	9.6

Project Name: 2731 W 12TH ST
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Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 08:30
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,06 Batch: WG1763653-5					
p-Chlorotoluene	ND		ug/kg	100	5.4
1,2-Dibromo-3-chloropropane	ND		ug/kg	150	50.
Hexachlorobutadiene	ND		ug/kg	200	8.4
Isopropylbenzene	ND		ug/kg	50	5.4
p-Isopropyltoluene	ND		ug/kg	50	5.4
Naphthalene	50	J	ug/kg	200	32.
Acrylonitrile	ND		ug/kg	200	58.
n-Propylbenzene	ND		ug/kg	50	8.6
1,2,3-Trichlorobenzene	ND		ug/kg	100	16.
1,2,4-Trichlorobenzene	ND		ug/kg	100	14.
1,3,5-Trimethylbenzene	ND		ug/kg	100	9.6
1,2,4-Trimethylbenzene	ND		ug/kg	100	17.
1,4-Dioxane	ND		ug/kg	4000	1800
p-Diethylbenzene	ND		ug/kg	100	8.8
p-Ethyltoluene	ND		ug/kg	100	19.
1,2,4,5-Tetramethylbenzene	ND		ug/kg	100	9.6
Ethyl ether	ND		ug/kg	100	17.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	71.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	88		70-130
Dibromofluoromethane	109		70-130

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 08:30
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1763657-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	ND		ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 08:30
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1763657-5					
1,2-Dichlorobenzene	ND		ug/kg	2.0	0.14
1,3-Dichlorobenzene	ND		ug/kg	2.0	0.15
1,4-Dichlorobenzene	ND		ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	ND		ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	ND		ug/kg	2.0	0.14
n-Butylbenzene	ND		ug/kg	1.0	0.17
sec-Butylbenzene	ND		ug/kg	1.0	0.15
tert-Butylbenzene	ND		ug/kg	2.0	0.12
o-Chlorotoluene	ND		ug/kg	2.0	0.19

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 04/06/23 08:30
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1763657-5					
p-Chlorotoluene	ND		ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	ND		ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	ND		ug/kg	1.0	0.11
Naphthalene	0.99	J	ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	ND		ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	ND		ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	ND		ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	ND		ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	90		70-130
4-Bromofluorobenzene	88		70-130
Dibromofluoromethane	109		70-130



Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
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Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 20:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 05 Batch: WG1763945-5					
Methylene chloride	ND		ug/kg	5.0	2.3
1,1-Dichloroethane	ND		ug/kg	1.0	0.14
Chloroform	ND		ug/kg	1.5	0.14
Carbon tetrachloride	ND		ug/kg	1.0	0.23
1,2-Dichloropropane	ND		ug/kg	1.0	0.12
Dibromochloromethane	ND		ug/kg	1.0	0.14
1,1,2-Trichloroethane	ND		ug/kg	1.0	0.27
Tetrachloroethene	ND		ug/kg	0.50	0.20
Chlorobenzene	ND		ug/kg	0.50	0.13
Trichlorofluoromethane	ND		ug/kg	4.0	0.70
1,2-Dichloroethane	ND		ug/kg	1.0	0.26
1,1,1-Trichloroethane	ND		ug/kg	0.50	0.17
Bromodichloromethane	ND		ug/kg	0.50	0.11
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.27
cis-1,3-Dichloropropene	ND		ug/kg	0.50	0.16
1,3-Dichloropropene, Total	ND		ug/kg	0.50	0.16
1,1-Dichloropropene	ND		ug/kg	0.50	0.16
Bromoform	ND		ug/kg	4.0	0.25
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.50	0.17
Benzene	ND		ug/kg	0.50	0.17
Toluene	ND		ug/kg	1.0	0.54
Ethylbenzene	ND		ug/kg	1.0	0.14
Chloromethane	ND		ug/kg	4.0	0.93
Bromomethane	0.60	J	ug/kg	2.0	0.58
Vinyl chloride	ND		ug/kg	1.0	0.34
Chloroethane	ND		ug/kg	2.0	0.45
1,1-Dichloroethene	ND		ug/kg	1.0	0.24
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.14
Trichloroethene	ND		ug/kg	0.50	0.14

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 20:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 05 Batch: WG1763945-5					
1,2-Dichlorobenzene	ND		ug/kg	2.0	0.14
1,3-Dichlorobenzene	ND		ug/kg	2.0	0.15
1,4-Dichlorobenzene	ND		ug/kg	2.0	0.17
Methyl tert butyl ether	ND		ug/kg	2.0	0.20
p/m-Xylene	ND		ug/kg	2.0	0.56
o-Xylene	ND		ug/kg	1.0	0.29
Xylenes, Total	ND		ug/kg	1.0	0.29
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.18
1,2-Dichloroethene, Total	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	2.0	0.24
Styrene	ND		ug/kg	1.0	0.20
Dichlorodifluoromethane	ND		ug/kg	10	0.92
Acetone	ND		ug/kg	10	4.8
Carbon disulfide	ND		ug/kg	10	4.6
2-Butanone	ND		ug/kg	10	2.2
Vinyl acetate	ND		ug/kg	10	2.2
4-Methyl-2-pentanone	ND		ug/kg	10	1.3
1,2,3-Trichloropropane	ND		ug/kg	2.0	0.13
2-Hexanone	ND		ug/kg	10	1.2
Bromochloromethane	ND		ug/kg	2.0	0.20
2,2-Dichloropropane	ND		ug/kg	2.0	0.20
1,2-Dibromoethane	ND		ug/kg	1.0	0.28
1,3-Dichloropropane	ND		ug/kg	2.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.50	0.13
Bromobenzene	ND		ug/kg	2.0	0.14
n-Butylbenzene	ND		ug/kg	1.0	0.17
sec-Butylbenzene	ND		ug/kg	1.0	0.15
tert-Butylbenzene	ND		ug/kg	2.0	0.12
o-Chlorotoluene	ND		ug/kg	2.0	0.19

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 04/06/23 20:23
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 05 Batch: WG1763945-5					
p-Chlorotoluene	ND		ug/kg	2.0	0.11
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.0	1.0
Hexachlorobutadiene	ND		ug/kg	4.0	0.17
Isopropylbenzene	ND		ug/kg	1.0	0.11
p-Isopropyltoluene	ND		ug/kg	1.0	0.11
Naphthalene	ND		ug/kg	4.0	0.65
Acrylonitrile	ND		ug/kg	4.0	1.2
n-Propylbenzene	ND		ug/kg	1.0	0.17
1,2,3-Trichlorobenzene	ND		ug/kg	2.0	0.32
1,2,4-Trichlorobenzene	ND		ug/kg	2.0	0.27
1,3,5-Trimethylbenzene	ND		ug/kg	2.0	0.19
1,2,4-Trimethylbenzene	ND		ug/kg	2.0	0.33
1,4-Dioxane	ND		ug/kg	80	35.
p-Diethylbenzene	ND		ug/kg	2.0	0.18
p-Ethyltoluene	ND		ug/kg	2.0	0.38
1,2,4,5-Tetramethylbenzene	ND		ug/kg	2.0	0.19
Ethyl ether	ND		ug/kg	2.0	0.34
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	1.4

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	122		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	111		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1762444-3 WG1762444-4								
Methylene chloride	95		100		70-130	5		20
1,1-Dichloroethane	93		98		70-130	5		20
Chloroform	100		110		70-130	10		20
Carbon tetrachloride	100		110		63-132	10		20
1,2-Dichloropropane	92		98		70-130	6		20
Dibromochloromethane	89		94		63-130	5		20
1,1,2-Trichloroethane	89		92		70-130	3		20
Tetrachloroethene	95		98		70-130	3		20
Chlorobenzene	95		99		75-130	4		20
Trichlorofluoromethane	95		100		62-150	5		20
1,2-Dichloroethane	90		97		70-130	7		20
1,1,1-Trichloroethane	96		100		67-130	4		20
Bromodichloromethane	92		97		67-130	5		20
trans-1,3-Dichloropropene	84		86		70-130	2		20
cis-1,3-Dichloropropene	90		96		70-130	6		20
1,1-Dichloropropene	91		100		70-130	9		20
Bromoform	76		79		54-136	4		20
1,1,2,2-Tetrachloroethane	86		91		67-130	6		20
Benzene	99		99		70-130	0		20
Toluene	94		97		70-130	3		20
Ethylbenzene	93		95		70-130	2		20
Chloromethane	88		90		64-130	2		20
Bromomethane	86		90		39-139	5		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1762444-3 WG1762444-4								
Vinyl chloride	96		100		55-140	4		20
Chloroethane	90		96		55-138	6		20
1,1-Dichloroethene	96		100		61-145	4		20
trans-1,2-Dichloroethene	95		100		70-130	5		20
Trichloroethene	93		95		70-130	2		20
1,2-Dichlorobenzene	93		96		70-130	3		20
1,3-Dichlorobenzene	95		96		70-130	1		20
1,4-Dichlorobenzene	94		96		70-130	2		20
Methyl tert butyl ether	86		95		63-130	10		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
cis-1,2-Dichloroethene	98		100		70-130	2		20
Dibromomethane	93		100		70-130	7		20
1,2,3-Trichloropropane	81		85		64-130	5		20
Acrylonitrile	80		87		70-130	8		20
Styrene	90		90		70-130	0		20
Dichlorodifluoromethane	97		100		36-147	3		20
Acetone	71		74		58-148	4		20
Carbon disulfide	88		95		51-130	8		20
2-Butanone	81		86		63-138	6		20
Vinyl acetate	79		89		70-130	12		20
4-Methyl-2-pentanone	72		83		59-130	14		20
2-Hexanone	59		69		57-130	16		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1762444-3 WG1762444-4								
Bromochloromethane	100		110		70-130	10		20
2,2-Dichloropropane	99		100		63-133	1		20
1,2-Dibromoethane	91		94		70-130	3		20
1,3-Dichloropropane	87		92		70-130	6		20
1,1,1,2-Tetrachloroethane	92		95		64-130	3		20
Bromobenzene	98		99		70-130	1		20
n-Butylbenzene	91		92		53-136	1		20
sec-Butylbenzene	95		96		70-130	1		20
tert-Butylbenzene	95		98		70-130	3		20
o-Chlorotoluene	95		97		70-130	2		20
p-Chlorotoluene	92		94		70-130	2		20
1,2-Dibromo-3-chloropropane	81		86		41-144	6		20
Hexachlorobutadiene	96		98		63-130	2		20
Isopropylbenzene	95		96		70-130	1		20
p-Isopropyltoluene	91		94		70-130	3		20
Naphthalene	91		97		70-130	6		20
n-Propylbenzene	94		95		69-130	1		20
1,2,3-Trichlorobenzene	95		98		70-130	3		20
1,2,4-Trichlorobenzene	94		99		70-130	5		20
1,3,5-Trimethylbenzene	88		90		64-130	2		20
1,2,4-Trimethylbenzene	89		91		70-130	2		20
1,4-Dioxane	68		72		56-162	6		20
p-Diethylbenzene	89		91		70-130	2		20

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07-08 Batch: WG1762444-3 WG1762444-4								
p-Ethyltoluene	93		94		70-130	1		20
1,2,4,5-Tetramethylbenzene	89		92		70-130	3		20
Ethyl ether	89		96		59-134	8		20
trans-1,4-Dichloro-2-butene	70		74		70-130	6		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	91		96		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	97		96		70-130
Dibromofluoromethane	101		105		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
Methylene chloride	95		94		70-130	1		30
1,1-Dichloroethane	103		101		70-130	2		30
Chloroform	107		106		70-130	1		30
Carbon tetrachloride	103		101		70-130	2		30
1,2-Dichloropropane	102		102		70-130	0		30
Dibromochloromethane	96		94		70-130	2		30
1,1,2-Trichloroethane	91		90		70-130	1		30
Tetrachloroethene	102		97		70-130	5		30
Chlorobenzene	97		94		70-130	3		30
Trichlorofluoromethane	115		110		70-139	4		30
1,2-Dichloroethane	103		104		70-130	1		30
1,1,1-Trichloroethane	110		108		70-130	2		30
Bromodichloromethane	105		106		70-130	1		30
trans-1,3-Dichloropropene	92		90		70-130	2		30
cis-1,3-Dichloropropene	106		108		70-130	2		30
1,1-Dichloropropene	106		104		70-130	2		30
Bromoform	88		86		70-130	2		30
1,1,2,2-Tetrachloroethane	84		82		70-130	2		30
Benzene	106		104		70-130	2		30
Toluene	91		87		70-130	4		30
Ethylbenzene	92		88		70-130	4		30
Chloromethane	113		109		52-130	4		30
Bromomethane	107		102		57-147	5		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
Vinyl chloride	112		106		67-130	6		30
Chloroethane	108		104		50-151	4		30
1,1-Dichloroethene	110		105		65-135	5		30
trans-1,2-Dichloroethene	110		108		70-130	2		30
Trichloroethene	107		104		70-130	3		30
1,2-Dichlorobenzene	95		89		70-130	7		30
1,3-Dichlorobenzene	95		89		70-130	7		30
1,4-Dichlorobenzene	95		90		70-130	5		30
Methyl tert butyl ether	108		110		66-130	2		30
p/m-Xylene	97		93		70-130	4		30
o-Xylene	98		94		70-130	4		30
cis-1,2-Dichloroethene	105		105		70-130	0		30
Dibromomethane	104		106		70-130	2		30
Styrene	96		94		70-130	2		30
Dichlorodifluoromethane	115		108		30-146	6		30
Acetone	96		104		54-140	8		30
Carbon disulfide	116		111		59-130	4		30
2-Butanone	78		81		70-130	4		30
Vinyl acetate	92		98		70-130	6		30
4-Methyl-2-pentanone	77		79		70-130	3		30
1,2,3-Trichloropropane	83		80		68-130	4		30
2-Hexanone	72		74		70-130	3		30
Bromochloromethane	114		116		70-130	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
2,2-Dichloropropane	103		101		70-130	2		30
1,2-Dibromoethane	95		94		70-130	1		30
1,3-Dichloropropane	91		90		69-130	1		30
1,1,1,2-Tetrachloroethane	101		98		70-130	3		30
Bromobenzene	94		90		70-130	4		30
n-Butylbenzene	90		85		70-130	6		30
sec-Butylbenzene	92		85		70-130	8		30
tert-Butylbenzene	92		85		70-130	8		30
o-Chlorotoluene	109		92		70-130	17		30
p-Chlorotoluene	90		83		70-130	8		30
1,2-Dibromo-3-chloropropane	76		79		68-130	4		30
Hexachlorobutadiene	94		91		67-130	3		30
Isopropylbenzene	92		83		70-130	10		30
p-Isopropyltoluene	94		88		70-130	7		30
Naphthalene	83		85		70-130	2		30
Acrylonitrile	78		82		70-130	5		30
n-Propylbenzene	91		84		70-130	8		30
1,2,3-Trichlorobenzene	94		95		70-130	1		30
1,2,4-Trichlorobenzene	97		96		70-130	1		30
1,3,5-Trimethylbenzene	93		86		70-130	8		30
1,2,4-Trimethylbenzene	93		87		70-130	7		30
1,4-Dioxane	77		82		65-136	6		30
p-Diethylbenzene	94		88		70-130	7		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02 Batch: WG1763068-3 WG1763068-4								
p-Ethyltoluene	94		87		70-130	8		30
1,2,4,5-Tetramethylbenzene	94		92		70-130	2		30
Ethyl ether	104		109		67-130	5		30
trans-1,4-Dichloro-2-butene	82		74		70-130	10		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	100		104		70-130
Toluene-d8	94		91		70-130
4-Bromofluorobenzene	94		90		70-130
Dibromofluoromethane	108		109		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,04-05 Batch: WG1763422-3 WG1763422-4								
Methylene chloride	92		98		70-130	6		30
1,1-Dichloroethane	99		105		70-130	6		30
Chloroform	104		108		70-130	4		30
Carbon tetrachloride	98		104		70-130	6		30
1,2-Dichloropropane	101		106		70-130	5		30
Dibromochloromethane	91		96		70-130	5		30
1,1,2-Trichloroethane	88		92		70-130	4		30
Tetrachloroethene	97		101		70-130	4		30
Chlorobenzene	92		97		70-130	5		30
Trichlorofluoromethane	109		117		70-139	7		30
1,2-Dichloroethane	102		109		70-130	7		30
1,1,1-Trichloroethane	106		112		70-130	6		30
Bromodichloromethane	102		108		70-130	6		30
trans-1,3-Dichloropropene	88		93		70-130	6		30
cis-1,3-Dichloropropene	105		112		70-130	6		30
1,1-Dichloropropene	102		109		70-130	7		30
Bromoform	82		85		70-130	4		30
1,1,2,2-Tetrachloroethane	77		81		70-130	5		30
Benzene	102		110		70-130	8		30
Toluene	86		90		70-130	5		30
Ethylbenzene	88		93		70-130	6		30
Chloromethane	109		116		52-130	6		30
Bromomethane	104		111		57-147	7		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,04-05 Batch: WG1763422-3 WG1763422-4								
Vinyl chloride	106		114		67-130	7		30
Chloroethane	102		109		50-151	7		30
1,1-Dichloroethene	103		110		65-135	7		30
trans-1,2-Dichloroethene	105		109		70-130	4		30
Trichloroethene	102		110		70-130	8		30
1,2-Dichlorobenzene	90		93		70-130	3		30
1,3-Dichlorobenzene	88		92		70-130	4		30
1,4-Dichlorobenzene	88		92		70-130	4		30
Methyl tert butyl ether	106		114		66-130	7		30
p/m-Xylene	93		97		70-130	4		30
o-Xylene	94		98		70-130	4		30
cis-1,2-Dichloroethene	104		110		70-130	6		30
Dibromomethane	104		110		70-130	6		30
Styrene	93		97		70-130	4		30
Dichlorodifluoromethane	106		113		30-146	6		30
Acetone	106		111		54-140	5		30
Carbon disulfide	109		115		59-130	5		30
2-Butanone	78		88		70-130	12		30
Vinyl acetate	92		93		70-130	1		30
4-Methyl-2-pentanone	74		77		70-130	4		30
1,2,3-Trichloropropane	75		80		68-130	6		30
2-Hexanone	70		74		70-130	6		30
Bromochloromethane	113		120		70-130	6		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,04-05 Batch: WG1763422-3 WG1763422-4								
2,2-Dichloropropane	100		105		70-130	5		30
1,2-Dibromoethane	92		96		70-130	4		30
1,3-Dichloropropane	88		92		69-130	4		30
1,1,1,2-Tetrachloroethane	94		101		70-130	7		30
Bromobenzene	88		93		70-130	6		30
n-Butylbenzene	85		88		70-130	3		30
sec-Butylbenzene	84		87		70-130	4		30
tert-Butylbenzene	84		88		70-130	5		30
o-Chlorotoluene	82		86		70-130	5		30
p-Chlorotoluene	83		86		70-130	4		30
1,2-Dibromo-3-chloropropane	71		76		68-130	7		30
Hexachlorobutadiene	92		92		67-130	0		30
Isopropylbenzene	83		87		70-130	5		30
p-Isopropyltoluene	87		90		70-130	3		30
Naphthalene	92		93		70-130	1		30
Acrylonitrile	77		83		70-130	8		30
n-Propylbenzene	83		87		70-130	5		30
1,2,3-Trichlorobenzene	93		94		70-130	1		30
1,2,4-Trichlorobenzene	96		96		70-130	0		30
1,3,5-Trimethylbenzene	86		89		70-130	3		30
1,2,4-Trimethylbenzene	86		90		70-130	5		30
1,4-Dioxane	76		81		65-136	6		30
p-Diethylbenzene	87		90		70-130	3		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,04-05 Batch: WG1763422-3 WG1763422-4								
p-Ethyltoluene	87		91		70-130	4		30
1,2,4,5-Tetramethylbenzene	91		94		70-130	3		30
Ethyl ether	107		112		67-130	5		30
trans-1,4-Dichloro-2-butene	69	Q	73		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	106		106		70-130
Toluene-d8	92		92		70-130
4-Bromofluorobenzene	90		90		70-130
Dibromofluoromethane	110		111		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,06 Batch: WG1763653-3 WG1763653-4								
Methylene chloride	93		88		70-130	6		30
1,1-Dichloroethane	97		94		70-130	3		30
Chloroform	100		99		70-130	1		30
Carbon tetrachloride	94		93		70-130	1		30
1,2-Dichloropropane	98		97		70-130	1		30
Dibromochloromethane	94		89		70-130	5		30
1,1,2-Trichloroethane	90		86		70-130	5		30
Tetrachloroethene	93		91		70-130	2		30
Chlorobenzene	91		88		70-130	3		30
Trichlorofluoromethane	104		101		70-139	3		30
1,2-Dichloroethane	102		98		70-130	4		30
1,1,1-Trichloroethane	101		99		70-130	2		30
Bromodichloromethane	102		99		70-130	3		30
trans-1,3-Dichloropropene	89		86		70-130	3		30
cis-1,3-Dichloropropene	103		101		70-130	2		30
1,1-Dichloropropene	96		96		70-130	0		30
Bromoform	83		81		70-130	2		30
1,1,2,2-Tetrachloroethane	80		77		70-130	4		30
Benzene	100		97		70-130	3		30
Toluene	83		82		70-130	1		30
Ethylbenzene	85		84		70-130	1		30
Chloromethane	103		101		52-130	2		30
Bromomethane	99		98		57-147	1		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,06 Batch: WG1763653-3 WG1763653-4								
Vinyl chloride	100		98		67-130	2		30
Chloroethane	98		96		50-151	2		30
1,1-Dichloroethene	94		94		65-135	0		30
trans-1,2-Dichloroethene	102		97		70-130	5		30
Trichloroethene	99		98		70-130	1		30
1,2-Dichlorobenzene	87		86		70-130	1		30
1,3-Dichlorobenzene	86		85		70-130	1		30
1,4-Dichlorobenzene	87		85		70-130	2		30
Methyl tert butyl ether	110		104		66-130	6		30
p/m-Xylene	89		88		70-130	1		30
o-Xylene	93		89		70-130	4		30
cis-1,2-Dichloroethene	100		98		70-130	2		30
Dibromomethane	103		101		70-130	2		30
Styrene	91		89		70-130	2		30
Dichlorodifluoromethane	101		98		30-146	3		30
Acetone	114		106		54-140	7		30
Carbon disulfide	104		101		59-130	3		30
2-Butanone	84		80		70-130	5		30
Vinyl acetate	95		88		70-130	8		30
4-Methyl-2-pentanone	80		76		70-130	5		30
1,2,3-Trichloropropane	79		77		68-130	3		30
2-Hexanone	76		72		70-130	5		30
Bromochloromethane	112		108		70-130	4		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,06 Batch: WG1763653-3 WG1763653-4								
2,2-Dichloropropane	94		92		70-130	2		30
1,2-Dibromoethane	95		91		70-130	4		30
1,3-Dichloropropane	90		87		69-130	3		30
1,1,1,2-Tetrachloroethane	95		93		70-130	2		30
Bromobenzene	88		85		70-130	3		30
n-Butylbenzene	80		80		70-130	0		30
sec-Butylbenzene	80		79		70-130	1		30
tert-Butylbenzene	80		80		70-130	0		30
o-Chlorotoluene	96		95		70-130	1		30
p-Chlorotoluene	80		79		70-130	1		30
1,2-Dibromo-3-chloropropane	76		74		68-130	3		30
Hexachlorobutadiene	85		85		67-130	0		30
Isopropylbenzene	80		78		70-130	3		30
p-Isopropyltoluene	83		82		70-130	1		30
Naphthalene	87		84		70-130	4		30
Acrylonitrile	84		80		70-130	5		30
n-Propylbenzene	79		78		70-130	1		30
1,2,3-Trichlorobenzene	93		91		70-130	2		30
1,2,4-Trichlorobenzene	93		91		70-130	2		30
1,3,5-Trimethylbenzene	83		81		70-130	2		30
1,2,4-Trimethylbenzene	83		82		70-130	1		30
1,4-Dioxane	89		82		65-136	8		30
p-Diethylbenzene	84		82		70-130	2		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,06 Batch: WG1763653-3 WG1763653-4								
p-Ethyltoluene	83		82		70-130	1		30
1,2,4,5-Tetramethylbenzene	88		87		70-130	1		30
Ethyl ether	106		105		67-130	1		30
trans-1,4-Dichloro-2-butene	75		72		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		107		70-130
Toluene-d8	91		91		70-130
4-Bromofluorobenzene	89		91		70-130
Dibromofluoromethane	109		110		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1763657-3 WG1763657-4								
Methylene chloride	93		88		70-130	6		30
1,1-Dichloroethane	97		94		70-130	3		30
Chloroform	100		99		70-130	1		30
Carbon tetrachloride	94		93		70-130	1		30
1,2-Dichloropropane	98		97		70-130	1		30
Dibromochloromethane	94		89		70-130	5		30
1,1,2-Trichloroethane	90		86		70-130	5		30
Tetrachloroethene	93		91		70-130	2		30
Chlorobenzene	91		88		70-130	3		30
Trichlorofluoromethane	104		101		70-139	3		30
1,2-Dichloroethane	102		98		70-130	4		30
1,1,1-Trichloroethane	101		99		70-130	2		30
Bromodichloromethane	102		99		70-130	3		30
trans-1,3-Dichloropropene	89		86		70-130	3		30
cis-1,3-Dichloropropene	103		101		70-130	2		30
1,1-Dichloropropene	96		96		70-130	0		30
Bromoform	83		81		70-130	2		30
1,1,2,2-Tetrachloroethane	80		77		70-130	4		30
Benzene	100		97		70-130	3		30
Toluene	83		82		70-130	1		30
Ethylbenzene	85		84		70-130	1		30
Chloromethane	103		101		52-130	2		30
Bromomethane	99		98		57-147	1		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1763657-3 WG1763657-4								
Vinyl chloride	100		98		67-130	2		30
Chloroethane	98		96		50-151	2		30
1,1-Dichloroethene	94		94		65-135	0		30
trans-1,2-Dichloroethene	102		97		70-130	5		30
Trichloroethene	99		98		70-130	1		30
1,2-Dichlorobenzene	87		86		70-130	1		30
1,3-Dichlorobenzene	86		85		70-130	1		30
1,4-Dichlorobenzene	87		85		70-130	2		30
Methyl tert butyl ether	110		104		66-130	6		30
p/m-Xylene	89		88		70-130	1		30
o-Xylene	93		89		70-130	4		30
cis-1,2-Dichloroethene	100		98		70-130	2		30
Dibromomethane	103		101		70-130	2		30
Styrene	91		89		70-130	2		30
Dichlorodifluoromethane	101		98		30-146	3		30
Acetone	114		106		54-140	7		30
Carbon disulfide	104		101		59-130	3		30
2-Butanone	84		80		70-130	5		30
Vinyl acetate	95		88		70-130	8		30
4-Methyl-2-pentanone	80		76		70-130	5		30
1,2,3-Trichloropropane	79		77		68-130	3		30
2-Hexanone	76		72		70-130	5		30
Bromochloromethane	112		108		70-130	4		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1763657-3 WG1763657-4								
2,2-Dichloropropane	94		92		70-130	2		30
1,2-Dibromoethane	95		91		70-130	4		30
1,3-Dichloropropane	90		87		69-130	3		30
1,1,1,2-Tetrachloroethane	95		93		70-130	2		30
Bromobenzene	88		85		70-130	3		30
n-Butylbenzene	80		80		70-130	0		30
sec-Butylbenzene	80		79		70-130	1		30
tert-Butylbenzene	80		80		70-130	0		30
o-Chlorotoluene	96		95		70-130	1		30
p-Chlorotoluene	80		79		70-130	1		30
1,2-Dibromo-3-chloropropane	76		74		68-130	3		30
Hexachlorobutadiene	85		85		67-130	0		30
Isopropylbenzene	80		78		70-130	3		30
p-Isopropyltoluene	83		82		70-130	1		30
Naphthalene	87		84		70-130	4		30
Acrylonitrile	84		80		70-130	5		30
n-Propylbenzene	79		78		70-130	1		30
1,2,3-Trichlorobenzene	93		91		70-130	2		30
1,2,4-Trichlorobenzene	93		91		70-130	2		30
1,3,5-Trimethylbenzene	83		81		70-130	2		30
1,2,4-Trimethylbenzene	83		82		70-130	1		30
1,4-Dioxane	89		82		65-136	8		30
p-Diethylbenzene	84		82		70-130	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1763657-3 WG1763657-4								
p-Ethyltoluene	83		82		70-130	1		30
1,2,4,5-Tetramethylbenzene	88		87		70-130	1		30
Ethyl ether	106		105		67-130	1		30
trans-1,4-Dichloro-2-butene	75		72		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		107		70-130
Toluene-d8	91		91		70-130
4-Bromofluorobenzene	89		91		70-130
Dibromofluoromethane	109		110		70-130

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 05 Batch: WG1763945-3 WG1763945-4								
Methylene chloride	95		92		70-130	3		30
1,1-Dichloroethane	107		104		70-130	3		30
Chloroform	104		101		70-130	3		30
Carbon tetrachloride	93		94		70-130	1		30
1,2-Dichloropropane	113		109		70-130	4		30
Dibromochloromethane	89		84		70-130	6		30
1,1,2-Trichloroethane	107		101		70-130	6		30
Tetrachloroethene	85		81		70-130	5		30
Chlorobenzene	103		96		70-130	7		30
Trichlorofluoromethane	119		115		70-139	3		30
1,2-Dichloroethane	104		101		70-130	3		30
1,1,1-Trichloroethane	103		101		70-130	2		30
Bromodichloromethane	107		105		70-130	2		30
trans-1,3-Dichloropropene	108		101		70-130	7		30
cis-1,3-Dichloropropene	114		111		70-130	3		30
1,1-Dichloropropene	98		96		70-130	2		30
Bromoform	81		76		70-130	6		30
1,1,2,2-Tetrachloroethane	97		88		70-130	10		30
Benzene	111		108		70-130	3		30
Toluene	102		95		70-130	7		30
Ethylbenzene	104		96		70-130	8		30
Chloromethane	126		123		52-130	2		30
Bromomethane	125		118		57-147	6		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 05 Batch: WG1763945-3 WG1763945-4								
Vinyl chloride	138	Q	131	Q	67-130	5		30
Chloroethane	141		130		50-151	8		30
1,1-Dichloroethene	123		98		65-135	23		30
trans-1,2-Dichloroethene	102		101		70-130	1		30
Trichloroethene	97		97		70-130	0		30
1,2-Dichlorobenzene	102		89		70-130	14		30
1,3-Dichlorobenzene	101		90		70-130	12		30
1,4-Dichlorobenzene	101		90		70-130	12		30
Methyl tert butyl ether	108		104		66-130	4		30
p/m-Xylene	110		98		70-130	12		30
o-Xylene	110		98		70-130	12		30
cis-1,2-Dichloroethene	99		98		70-130	1		30
Dibromomethane	99		97		70-130	2		30
Styrene	110		100		70-130	10		30
Dichlorodifluoromethane	113		110		30-146	3		30
Acetone	84		90		54-140	7		30
Carbon disulfide	127		107		59-130	17		30
2-Butanone	99		101		70-130	2		30
Vinyl acetate	110		103		70-130	7		30
4-Methyl-2-pentanone	108		101		70-130	7		30
1,2,3-Trichloropropane	104		96		68-130	8		30
2-Hexanone	99		94		70-130	5		30
Bromochloromethane	95		94		70-130	1		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 05 Batch: WG1763945-3 WG1763945-4								
2,2-Dichloropropane	101		99		70-130	2		30
1,2-Dibromoethane	90		85		70-130	6		30
1,3-Dichloropropane	107		100		69-130	7		30
1,1,1,2-Tetrachloroethane	93		87		70-130	7		30
Bromobenzene	97		87		70-130	11		30
n-Butylbenzene	115		103		70-130	11		30
sec-Butylbenzene	107		96		70-130	11		30
tert-Butylbenzene	103		92		70-130	11		30
o-Chlorotoluene	110		99		70-130	11		30
p-Chlorotoluene	109		97		70-130	12		30
1,2-Dibromo-3-chloropropane	89		83		68-130	7		30
Hexachlorobutadiene	91		83		67-130	9		30
Isopropylbenzene	104		94		70-130	10		30
p-Isopropyltoluene	107		94		70-130	13		30
Naphthalene	94		86		70-130	9		30
Acrylonitrile	109		107		70-130	2		30
n-Propylbenzene	110		98		70-130	12		30
1,2,3-Trichlorobenzene	93		84		70-130	10		30
1,2,4-Trichlorobenzene	96		86		70-130	11		30
1,3,5-Trimethylbenzene	112		98		70-130	13		30
1,2,4-Trimethylbenzene	111		98		70-130	12		30
1,4-Dioxane	87		89		65-136	2		30
p-Diethylbenzene	110		98		70-130	12		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 05 Batch: WG1763945-3 WG1763945-4								
p-Ethyltoluene	111		98		70-130	12		30
1,2,4,5-Tetramethylbenzene	92		81		70-130	13		30
Ethyl ether	123		116		67-130	6		30
trans-1,4-Dichloro-2-butene	110		101		70-130	9		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	101		101		70-130
Toluene-d8	102		100		70-130
4-Bromofluorobenzene	100		99		70-130
Dibromofluoromethane	95		96		70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1763657-6 WG1763657-7 QC Sample: L2317033-03 Client ID: SB01_0-2												
Methylene chloride	ND	207	190	91		140	112		70-130	33	Q	30
1,1-Dichloroethane	ND	207	210	100		150	123		70-130	33	Q	30
Chloroform	ND	207	210	102		150	121		70-130	37	Q	30
Carbon tetrachloride	ND	207	210	101		150	125		70-130	33	Q	30
1,2-Dichloropropane	ND	207	210	99		150	121		70-130	34	Q	30
Dibromochloromethane	ND	207	180	88		130	110		70-130	32	Q	30
1,1,2-Trichloroethane	ND	207	170	82		120	102		70-130	33	Q	30
Tetrachloroethene	ND	207	190	89		120	103		70-130	39	Q	30
Chlorobenzene	ND	207	180	84		120	98		70-130	39	Q	30
Trichlorofluoromethane	ND	207	240	115		170	141	Q	70-139	33	Q	30
1,2-Dichloroethane	ND	207	210	99		150	122		70-130	33	Q	30
1,1,1-Trichloroethane	ND	207	220	108		160	133	Q	70-130	33	Q	30
Bromodichloromethane	ND	207	210	101		150	125		70-130	33	Q	30
trans-1,3-Dichloropropene	ND	207	170	82		120	100		70-130	34	Q	30
cis-1,3-Dichloropropene	ND	207	210	100		150	121		70-130	35	Q	30
1,1-Dichloropropene	ND	207	210	102		150	122		70-130	36	Q	30
Bromoform	ND	207	160	76		120	96		70-130	31	Q	30
1,1,2,2-Tetrachloroethane	ND	207	150	73		110	90		70-130	33	Q	30
Benzene	ND	207	210	101		150	122		70-130	35	Q	30
Toluene	ND	207	170	80		120	96		70-130	37	Q	30
Ethylbenzene	0.21J	207	170	80		110	92		70-130	41	Q	30
Chloromethane	ND	207	220	105		160	134	Q	52-130	30		30
Bromomethane	ND	207	220	104		150	127		57-147	34	Q	30

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1763657-6 WG1763657-7 QC Sample: L2317033-03 Client ID: SB01_0-2												
Vinyl chloride	ND	207	230	109		160	136	Q	67-130	33	Q	30
Chloroethane	ND	207	220	106		160	131		50-151	33	Q	30
1,1-Dichloroethene	ND	207	220	105		160	130		65-135	33	Q	30
trans-1,2-Dichloroethene	ND	207	220	105		150	127		70-130	35	Q	30
Trichloroethene	ND	207	200	98		140	118		70-130	36	Q	30
1,2-Dichlorobenzene	ND	207	150	74		100	86		70-130	40	Q	30
1,3-Dichlorobenzene	ND	207	150	73		98	82		70-130	42	Q	30
1,4-Dichlorobenzene	ND	207	150	72		97	81		70-130	43	Q	30
Methyl tert butyl ether	ND	207	210	103		160	129		66-130	32	Q	30
p/m-Xylene	ND	415	350	83		230	95		70-130	41	Q	30
o-Xylene	ND	415	350	85		240	98		70-130	40	Q	30
cis-1,2-Dichloroethene	ND	207	210	102		150	125		70-130	34	Q	30
Dibromomethane	ND	207	210	100		150	125		70-130	32	Q	30
Styrene	ND	415	350	83		230	94		70-130	42	Q	30
Dichlorodifluoromethane	ND	207	230	112		170	137		30-146	34	Q	30
Acetone	ND	207	180	85		120	100		54-140	38	Q	30
Carbon disulfide	ND	207	220	107		160	130		59-130	35	Q	30
2-Butanone	ND	207	130	64	Q	99	82		70-130	30		30
Vinyl acetate	ND	207	85	41	Q	38	31	Q	70-130	77	Q	30
4-Methyl-2-pentanone	ND	207	140	68	Q	100	86		70-130	30		30
1,2,3-Trichloropropane	ND	207	140	69		100	85		68-130	34	Q	30
2-Hexanone	ND	207	130	61	Q	93	77		70-130	31	Q	30
Bromochloromethane	ND	207	230	110		160	136	Q	70-130	34	Q	30

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1763657-6 WG1763657-7 QC Sample: L2317033-03 Client ID: SB01_0-2												
2,2-Dichloropropane	ND	207	210	100		150	123		70-130	34	Q	30
1,2-Dibromoethane	ND	207	180	85		130	106		70-130	32	Q	30
1,3-Dichloropropane	ND	207	170	82		120	101		69-130	33	Q	30
1,1,1,2-Tetrachloroethane	ND	207	190	92		130	111		70-130	35	Q	30
Bromobenzene	ND	207	160	78		110	92		70-130	38	Q	30
n-Butylbenzene	ND	207	140	67	Q	84	70		70-130	49	Q	30
sec-Butylbenzene	ND	207	150	72		93	77		70-130	46	Q	30
tert-Butylbenzene	ND	207	150	74		98	82		70-130	44	Q	30
o-Chlorotoluene	ND	207	180	86		97	81		70-130	59	Q	30
p-Chlorotoluene	ND	207	140	69	Q	93	77		70-130	43	Q	30
1,2-Dibromo-3-chloropropane	ND	207	130	65	Q	100	84		68-130	28		30
Hexachlorobutadiene	ND	207	140	68		86	72		67-130	48	Q	30
Isopropylbenzene	ND	207	150	74		100	83		70-130	43	Q	30
p-Isopropyltoluene	ND	207	150	72		93	77		70-130	47	Q	30
Naphthalene	1.2J	207	130	63	Q	94	78		70-130	33	Q	30
Acrylonitrile	ND	207	150	71		110	87		70-130	33	Q	30
n-Propylbenzene	ND	207	150	71		94	78		70-130	45	Q	30
1,2,3-Trichlorobenzene	ND	207	130	64	Q	94	78		70-130	34	Q	30
1,2,4-Trichlorobenzene	ND	207	130	65	Q	91	76		70-130	38	Q	30
1,3,5-Trimethylbenzene	ND	207	150	73		97	81		70-130	44	Q	30
1,2,4-Trimethylbenzene	ND	207	150	72		96	80		70-130	44	Q	30
1,4-Dioxane	ND	10400	9800	95		5700	95		65-136	53	Q	30
p-Diethylbenzene	ND	207	150	70		90	75		70-130	48	Q	30

Matrix Spike Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1763657-6 WG1763657-7 QC Sample: L2317033-03 Client ID: SB01_0-2												
p-Ethyltoluene	ND	207	150	73		96	80		70-130	45	Q	30
1,2,4,5-Tetramethylbenzene	ND	207	140	68	Q	91	76		70-130	42	Q	30
Ethyl ether	ND	207	220	106		160	129		67-130	35	Q	30
trans-1,4-Dichloro-2-butene	ND	207	130	62	Q	92	76		70-130	34	Q	30

Surrogate	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		106		70-130
4-Bromofluorobenzene	92		91		70-130
Dibromofluoromethane	113		111		70-130
Toluene-d8	91		90		70-130

SEMIVOLATILES

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-01 D2
 Client ID: SB05_6-8
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/07/23 10:46
 Analyst: IM
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	3400000		ug/kg	190000	23000	1000
2-Methylnaphthalene	860000		ug/kg	230000	23000	1000

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-01 D
 Client ID: SB05_6-8
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/07/23 03:37
 Analyst: LJG
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	9400		ug/kg	3000	400	20
1,2,4-Trichlorobenzene	ND		ug/kg	3800	440	20
Hexachlorobenzene	ND		ug/kg	2300	430	20
Bis(2-chloroethyl)ether	ND		ug/kg	3400	520	20
2-Chloronaphthalene	ND		ug/kg	3800	380	20
1,2-Dichlorobenzene	ND		ug/kg	3800	680	20
1,3-Dichlorobenzene	ND		ug/kg	3800	660	20
1,4-Dichlorobenzene	ND		ug/kg	3800	660	20
3,3'-Dichlorobenzidine	ND		ug/kg	3800	1000	20
2,4-Dinitrotoluene	ND		ug/kg	3800	760	20
2,6-Dinitrotoluene	ND		ug/kg	3800	650	20
Fluoranthene	8100		ug/kg	2300	440	20
4-Chlorophenyl phenyl ether	ND		ug/kg	3800	410	20
4-Bromophenyl phenyl ether	ND		ug/kg	3800	580	20
Bis(2-chloroisopropyl)ether	ND		ug/kg	4600	650	20
Bis(2-chloroethoxy)methane	ND		ug/kg	4100	380	20
Hexachlorobutadiene	ND		ug/kg	3800	560	20
Hexachlorocyclopentadiene	ND		ug/kg	11000	3400	20
Hexachloroethane	ND		ug/kg	3000	620	20
Isophorone	ND		ug/kg	3400	490	20
Naphthalene	830000	E	ug/kg	3800	460	20
Nitrobenzene	ND		ug/kg	3400	560	20
NDPA/DPA	ND		ug/kg	3000	430	20
n-Nitrosodi-n-propylamine	ND		ug/kg	3800	590	20
Bis(2-ethylhexyl)phthalate	ND		ug/kg	3800	1300	20
Butyl benzyl phthalate	ND		ug/kg	3800	960	20
Di-n-butylphthalate	ND		ug/kg	3800	720	20
Di-n-octylphthalate	ND		ug/kg	3800	1300	20

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-01 D
 Client ID: SB05_6-8
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	3800	350	20
Dimethyl phthalate	ND		ug/kg	3800	800	20
Benzo(a)anthracene	3500		ug/kg	2300	430	20
Benzo(a)pyrene	2700	J	ug/kg	3000	930	20
Benzo(b)fluoranthene	2800		ug/kg	2300	640	20
Benzo(k)fluoranthene	950	J	ug/kg	2300	610	20
Chrysene	3900		ug/kg	2300	400	20
Acenaphthylene	60000		ug/kg	3000	590	20
Anthracene	5400		ug/kg	2300	740	20
Benzo(ghi)perylene	1600	J	ug/kg	3000	450	20
Fluorene	32000		ug/kg	3800	370	20
Phenanthrene	41000		ug/kg	2300	460	20
Dibenzo(a,h)anthracene	460	J	ug/kg	2300	440	20
Indeno(1,2,3-cd)pyrene	1500	J	ug/kg	3000	530	20
Pyrene	12000		ug/kg	2300	380	20
Biphenyl	44000		ug/kg	8700	500	20
4-Chloroaniline	ND		ug/kg	3800	690	20
2-Nitroaniline	ND		ug/kg	3800	740	20
3-Nitroaniline	ND		ug/kg	3800	720	20
4-Nitroaniline	ND		ug/kg	3800	1600	20
Dibenzofuran	5700		ug/kg	3800	360	20
2-Methylnaphthalene	600000	E	ug/kg	4600	460	20
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	3800	400	20
Acetophenone	ND		ug/kg	3800	470	20
2,4,6-Trichlorophenol	ND		ug/kg	2300	720	20
p-Chloro-m-cresol	ND		ug/kg	3800	570	20
2-Chlorophenol	ND		ug/kg	3800	450	20
2,4-Dichlorophenol	ND		ug/kg	3400	610	20
2,4-Dimethylphenol	ND		ug/kg	3800	1200	20
2-Nitrophenol	ND		ug/kg	8200	1400	20
4-Nitrophenol	ND		ug/kg	5300	1600	20
2,4-Dinitrophenol	ND		ug/kg	18000	1800	20
4,6-Dinitro-o-cresol	ND		ug/kg	9900	1800	20
Pentachlorophenol	ND		ug/kg	3000	840	20
Phenol	ND		ug/kg	3800	580	20
2-Methylphenol	ND		ug/kg	3800	590	20
3-Methylphenol/4-Methylphenol	ND		ug/kg	5500	600	20

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-01 D

Date Collected: 03/31/23 09:50

Client ID: SB05_6-8

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	3800	730	20
Benzoic Acid	ND		ug/kg	12000	3800	20
Benzyl Alcohol	ND		ug/kg	3800	1200	20
Carbazole	ND		ug/kg	3800	370	20
1,4-Dioxane	ND		ug/kg	570	180	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	0	Q	25-120
Phenol-d6	0	Q	10-120
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
2,4,6-Tribromophenol	0	Q	10-136
4-Terphenyl-d14	0	Q	18-120

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02 D2
 Client ID: SB05_8-10
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/07/23 11:10
 Analyst: IM
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	1400000		ug/kg	97000	12000	500
2-Methylnaphthalene	350000		ug/kg	120000	12000	500

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02 D
 Client ID: SB05_8-10
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/07/23 04:24
 Analyst: LJG
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	1500	200	10
1,2,4-Trichlorobenzene	ND		ug/kg	1900	220	10
Hexachlorobenzene	ND		ug/kg	1200	220	10
Bis(2-chloroethyl)ether	ND		ug/kg	1700	260	10
2-Chloronaphthalene	ND		ug/kg	1900	190	10
1,2-Dichlorobenzene	ND		ug/kg	1900	350	10
1,3-Dichlorobenzene	ND		ug/kg	1900	330	10
1,4-Dichlorobenzene	ND		ug/kg	1900	340	10
3,3'-Dichlorobenzidine	ND		ug/kg	1900	520	10
2,4-Dinitrotoluene	ND		ug/kg	1900	390	10
2,6-Dinitrotoluene	ND		ug/kg	1900	330	10
Fluoranthene	3400		ug/kg	1200	220	10
4-Chlorophenyl phenyl ether	ND		ug/kg	1900	210	10
4-Bromophenyl phenyl ether	ND		ug/kg	1900	300	10
Bis(2-chloroisopropyl)ether	ND		ug/kg	2300	330	10
Bis(2-chloroethoxy)methane	ND		ug/kg	2100	190	10
Hexachlorobutadiene	ND		ug/kg	1900	280	10
Hexachlorocyclopentadiene	ND		ug/kg	5500	1800	10
Hexachloroethane	ND		ug/kg	1500	310	10
Isophorone	ND		ug/kg	1700	250	10
Naphthalene	340000	E	ug/kg	1900	240	10
Nitrobenzene	ND		ug/kg	1700	290	10
NDPA/DPA	ND		ug/kg	1500	220	10
n-Nitrosodi-n-propylamine	ND		ug/kg	1900	300	10
Bis(2-ethylhexyl)phthalate	ND		ug/kg	1900	670	10
Butyl benzyl phthalate	ND		ug/kg	1900	490	10
Di-n-butylphthalate	ND		ug/kg	1900	370	10
Di-n-octylphthalate	ND		ug/kg	1900	660	10



Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02 D
 Client ID: SB05_8-10
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	1900	180	10
Dimethyl phthalate	ND		ug/kg	1900	410	10
Benzo(a)anthracene	1600		ug/kg	1200	220	10
Benzo(a)pyrene	1200	J	ug/kg	1500	470	10
Benzo(b)fluoranthene	1200		ug/kg	1200	330	10
Benzo(k)fluoranthene	460	J	ug/kg	1200	310	10
Chrysene	1800		ug/kg	1200	200	10
Acenaphthylene	26000		ug/kg	1500	300	10
Anthracene	2200		ug/kg	1200	380	10
Benzo(ghi)perylene	660	J	ug/kg	1500	230	10
Fluorene	14000		ug/kg	1900	190	10
Phenanthrene	17000		ug/kg	1200	240	10
Dibenzo(a,h)anthracene	ND		ug/kg	1200	220	10
Indeno(1,2,3-cd)pyrene	610	J	ug/kg	1500	270	10
Pyrene	5300		ug/kg	1200	190	10
Biphenyl	17000		ug/kg	4400	250	10
4-Chloroaniline	ND		ug/kg	1900	350	10
2-Nitroaniline	ND		ug/kg	1900	370	10
3-Nitroaniline	ND		ug/kg	1900	360	10
4-Nitroaniline	ND		ug/kg	1900	800	10
Dibenzofuran	2600		ug/kg	1900	180	10
2-Methylnaphthalene	250000	E	ug/kg	2300	230	10
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	1900	200	10
Acetophenone	ND		ug/kg	1900	240	10
2,4,6-Trichlorophenol	ND		ug/kg	1200	370	10
p-Chloro-m-cresol	ND		ug/kg	1900	290	10
2-Chlorophenol	ND		ug/kg	1900	230	10
2,4-Dichlorophenol	ND		ug/kg	1700	310	10
2,4-Dimethylphenol	ND		ug/kg	1900	640	10
2-Nitrophenol	ND		ug/kg	4200	730	10
4-Nitrophenol	ND		ug/kg	2700	790	10
2,4-Dinitrophenol	ND		ug/kg	9300	900	10
4,6-Dinitro-o-cresol	ND		ug/kg	5000	930	10
Pentachlorophenol	ND		ug/kg	1500	430	10
Phenol	ND		ug/kg	1900	290	10
2-Methylphenol	ND		ug/kg	1900	300	10
3-Methylphenol/4-Methylphenol	ND		ug/kg	2800	300	10

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-02 D

Date Collected: 03/31/23 10:00

Client ID: SB05_8-10

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	1900	370	10
Benzoic Acid	ND		ug/kg	6300	2000	10
Benzyl Alcohol	ND		ug/kg	1900	590	10
Carbazole	ND		ug/kg	1900	190	10
1,4-Dioxane	ND		ug/kg	290	89.	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	89		25-120
Phenol-d6	98		10-120
Nitrobenzene-d5	98		23-120
2-Fluorobiphenyl	115		30-120
2,4,6-Tribromophenol	111		10-136
4-Terphenyl-d14	118		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-03
 Client ID: SB01_0-2
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 14:20
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/05/23 05:51
 Analyst: MG
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	140	19.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	21.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	24.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
1,2-Dichlorobenzene	ND		ug/kg	180	32.	1
1,3-Dichlorobenzene	ND		ug/kg	180	31.	1
1,4-Dichlorobenzene	ND		ug/kg	180	32.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	36.	1
2,6-Dinitrotoluene	ND		ug/kg	180	31.	1
Fluoranthene	ND		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	31.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	160	1
Hexachloroethane	ND		ug/kg	140	29.	1
Isophorone	ND		ug/kg	160	23.	1
Naphthalene	35	J	ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	27.	1
NDPA/DPA	ND		ug/kg	140	20.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	28.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	63.	1
Butyl benzyl phthalate	ND		ug/kg	180	46.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	62.	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-03

Date Collected: 03/31/23 14:20

Client ID: SB01_0-2

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	180	17.	1
Dimethyl phthalate	ND		ug/kg	180	38.	1
Benzo(a)anthracene	ND		ug/kg	110	20.	1
Benzo(a)pyrene	ND		ug/kg	140	44.	1
Benzo(b)fluoranthene	ND		ug/kg	110	30.	1
Benzo(k)fluoranthene	ND		ug/kg	110	29.	1
Chrysene	ND		ug/kg	110	19.	1
Acenaphthylene	ND		ug/kg	140	28.	1
Anthracene	ND		ug/kg	110	35.	1
Benzo(ghi)perylene	ND		ug/kg	140	21.	1
Fluorene	ND		ug/kg	180	18.	1
Phenanthrene	ND		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	ND		ug/kg	140	25.	1
Pyrene	ND		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	410	24.	1
4-Chloroaniline	ND		ug/kg	180	33.	1
2-Nitroaniline	ND		ug/kg	180	35.	1
3-Nitroaniline	ND		ug/kg	180	34.	1
4-Nitroaniline	ND		ug/kg	180	75.	1
Dibenzofuran	ND		ug/kg	180	17.	1
2-Methylnaphthalene	ND		ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	27.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	29.	1
2,4-Dimethylphenol	ND		ug/kg	180	60.	1
2-Nitrophenol	ND		ug/kg	390	68.	1
4-Nitrophenol	ND		ug/kg	250	74.	1
2,4-Dinitrophenol	ND		ug/kg	870	84.	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	87.	1
Pentachlorophenol	ND		ug/kg	140	40.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	28.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	28.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-03**Date Collected:** 03/31/23 14:20**Client ID:** SB01_0-2**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	180	35.	1
Benzoic Acid	ND		ug/kg	590	180	1
Benzyl Alcohol	ND		ug/kg	180	55.	1
Carbazole	ND		ug/kg	180	18.	1
1,4-Dioxane	ND		ug/kg	27	8.3	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	60		25-120
Phenol-d6	63		10-120
Nitrobenzene-d5	55		23-120
2-Fluorobiphenyl	66		30-120
2,4,6-Tribromophenol	80		10-136
4-Terphenyl-d14	74		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-04
 Client ID: SB01_9-11
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 11:55
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/05/23 07:25
 Analyst: MG
 Percent Solids: 61%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	380		ug/kg	210	28.	1
1,2,4-Trichlorobenzene	ND		ug/kg	270	30.	1
Hexachlorobenzene	ND		ug/kg	160	30.	1
Bis(2-chloroethyl)ether	ND		ug/kg	240	36.	1
2-Chloronaphthalene	ND		ug/kg	270	26.	1
1,2-Dichlorobenzene	ND		ug/kg	270	48.	1
1,3-Dichlorobenzene	ND		ug/kg	270	46.	1
1,4-Dichlorobenzene	ND		ug/kg	270	47.	1
3,3'-Dichlorobenzidine	ND		ug/kg	270	71.	1
2,4-Dinitrotoluene	ND		ug/kg	270	53.	1
2,6-Dinitrotoluene	ND		ug/kg	270	46.	1
Fluoranthene	680		ug/kg	160	31.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	270	28.	1
4-Bromophenyl phenyl ether	ND		ug/kg	270	41.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	320	46.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	290	27.	1
Hexachlorobutadiene	ND		ug/kg	270	39.	1
Hexachlorocyclopentadiene	ND		ug/kg	760	240	1
Hexachloroethane	ND		ug/kg	210	43.	1
Isophorone	ND		ug/kg	240	35.	1
Naphthalene	16000	E	ug/kg	270	32.	1
Nitrobenzene	ND		ug/kg	240	40.	1
NDPA/DPA	ND		ug/kg	210	30.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	270	41.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	270	92.	1
Butyl benzyl phthalate	ND		ug/kg	270	67.	1
Di-n-butylphthalate	ND		ug/kg	270	51.	1
Di-n-octylphthalate	ND		ug/kg	270	91.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-04**Date Collected:** 03/31/23 11:55**Client ID:** SB01_9-11**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	270	25.	1
Dimethyl phthalate	ND		ug/kg	270	56.	1
Benzo(a)anthracene	660		ug/kg	160	30.	1
Benzo(a)pyrene	980		ug/kg	210	65.	1
Benzo(b)fluoranthene	860		ug/kg	160	45.	1
Benzo(k)fluoranthene	320		ug/kg	160	43.	1
Chrysene	710		ug/kg	160	28.	1
Acenaphthylene	380		ug/kg	210	41.	1
Anthracene	180		ug/kg	160	52.	1
Benzo(ghi)perylene	470		ug/kg	210	31.	1
Fluorene	470		ug/kg	270	26.	1
Phenanthrene	720		ug/kg	160	32.	1
Dibenzo(a,h)anthracene	120	J	ug/kg	160	31.	1
Indeno(1,2,3-cd)pyrene	480		ug/kg	210	37.	1
Pyrene	1300		ug/kg	160	26.	1
Biphenyl	98	J	ug/kg	610	35.	1
4-Chloroaniline	ND		ug/kg	270	49.	1
2-Nitroaniline	ND		ug/kg	270	52.	1
3-Nitroaniline	ND		ug/kg	270	50.	1
4-Nitroaniline	ND		ug/kg	270	110	1
Dibenzofuran	85	J	ug/kg	270	25.	1
2-Methylnaphthalene	670		ug/kg	320	32.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	270	28.	1
Acetophenone	100	J	ug/kg	270	33.	1
2,4,6-Trichlorophenol	ND		ug/kg	160	51.	1
p-Chloro-m-cresol	ND		ug/kg	270	40.	1
2-Chlorophenol	ND		ug/kg	270	32.	1
2,4-Dichlorophenol	ND		ug/kg	240	43.	1
2,4-Dimethylphenol	ND		ug/kg	270	88.	1
2-Nitrophenol	ND		ug/kg	580	100	1
4-Nitrophenol	ND		ug/kg	370	110	1
2,4-Dinitrophenol	ND		ug/kg	1300	120	1
4,6-Dinitro-o-cresol	ND		ug/kg	690	130	1
Pentachlorophenol	ND		ug/kg	210	59.	1
Phenol	ND		ug/kg	270	40.	1
2-Methylphenol	ND		ug/kg	270	41.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	380	42.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-04**Date Collected:** 03/31/23 11:55**Client ID:** SB01_9-11**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	270	51.	1
Benzoic Acid	ND		ug/kg	860	270	1
Benzyl Alcohol	ND		ug/kg	270	82.	1
Carbazole	37	J	ug/kg	270	26.	1
1,4-Dioxane	ND		ug/kg	40	12.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	59		25-120
Phenol-d6	57		10-120
Nitrobenzene-d5	61		23-120
2-Fluorobiphenyl	69		30-120
2,4,6-Tribromophenol	77		10-136
4-Terphenyl-d14	66		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-04 D
 Client ID: SB01_9-11
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 11:55
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/07/23 05:11
 Analyst: LJG
 Percent Solids: 61%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	19000		ug/kg	1100	130	4
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Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-05
 Client ID: SB13_12-14
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 15:35
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/05/23 03:53
 Analyst: MG
 Percent Solids: 87%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	50	J	ug/kg	150	20.	1
1,2,4-Trichlorobenzene	ND		ug/kg	190	22.	1
Hexachlorobenzene	ND		ug/kg	110	21.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	26.	1
2-Chloronaphthalene	ND		ug/kg	190	19.	1
1,2-Dichlorobenzene	ND		ug/kg	190	34.	1
1,3-Dichlorobenzene	ND		ug/kg	190	33.	1
1,4-Dichlorobenzene	ND		ug/kg	190	33.	1
3,3'-Dichlorobenzidine	ND		ug/kg	190	50.	1
2,4-Dinitrotoluene	ND		ug/kg	190	38.	1
2,6-Dinitrotoluene	ND		ug/kg	190	32.	1
Fluoranthene	ND		ug/kg	110	22.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	190	20.	1
4-Bromophenyl phenyl ether	ND		ug/kg	190	29.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	230	32.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	19.	1
Hexachlorobutadiene	ND		ug/kg	190	28.	1
Hexachlorocyclopentadiene	ND		ug/kg	540	170	1
Hexachloroethane	ND		ug/kg	150	31.	1
Isophorone	ND		ug/kg	170	25.	1
Naphthalene	270		ug/kg	190	23.	1
Nitrobenzene	ND		ug/kg	170	28.	1
NDPA/DPA	ND		ug/kg	150	22.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	190	29.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	190	66.	1
Butyl benzyl phthalate	ND		ug/kg	190	48.	1
Di-n-butylphthalate	ND		ug/kg	190	36.	1
Di-n-octylphthalate	ND		ug/kg	190	64.	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-05

Date Collected: 03/31/23 15:35

Client ID: SB13_12-14

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	190	18.	1
Dimethyl phthalate	ND		ug/kg	190	40.	1
Benzo(a)anthracene	ND		ug/kg	110	21.	1
Benzo(a)pyrene	ND		ug/kg	150	46.	1
Benzo(b)fluoranthene	ND		ug/kg	110	32.	1
Benzo(k)fluoranthene	ND		ug/kg	110	30.	1
Chrysene	ND		ug/kg	110	20.	1
Acenaphthylene	ND		ug/kg	150	29.	1
Anthracene	ND		ug/kg	110	37.	1
Benzo(ghi)perylene	ND		ug/kg	150	22.	1
Fluorene	29	J	ug/kg	190	18.	1
Phenanthrene	51	J	ug/kg	110	23.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	22.	1
Indeno(1,2,3-cd)pyrene	ND		ug/kg	150	26.	1
Pyrene	34	J	ug/kg	110	19.	1
Biphenyl	ND		ug/kg	430	25.	1
4-Chloroaniline	ND		ug/kg	190	34.	1
2-Nitroaniline	ND		ug/kg	190	37.	1
3-Nitroaniline	ND		ug/kg	190	36.	1
4-Nitroaniline	ND		ug/kg	190	79.	1
Dibenzofuran	ND		ug/kg	190	18.	1
2-Methylnaphthalene	37	J	ug/kg	230	23.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	190	20.	1
Acetophenone	ND		ug/kg	190	24.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	36.	1
p-Chloro-m-cresol	ND		ug/kg	190	28.	1
2-Chlorophenol	ND		ug/kg	190	22.	1
2,4-Dichlorophenol	ND		ug/kg	170	30.	1
2,4-Dimethylphenol	ND		ug/kg	190	63.	1
2-Nitrophenol	ND		ug/kg	410	71.	1
4-Nitrophenol	ND		ug/kg	260	78.	1
2,4-Dinitrophenol	ND		ug/kg	910	88.	1
4,6-Dinitro-o-cresol	ND		ug/kg	490	91.	1
Pentachlorophenol	ND		ug/kg	150	42.	1
Phenol	ND		ug/kg	190	29.	1
2-Methylphenol	ND		ug/kg	190	29.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	270	30.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-05**Date Collected:** 03/31/23 15:35**Client ID:** SB13_12-14**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	190	36.	1
Benzoic Acid	ND		ug/kg	620	190	1
Benzyl Alcohol	ND		ug/kg	190	58.	1
Carbazole	ND		ug/kg	190	18.	1
1,4-Dioxane	ND		ug/kg	28	8.7	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	66		25-120
Phenol-d6	68		10-120
Nitrobenzene-d5	61		23-120
2-Fluorobiphenyl	73		30-120
2,4,6-Tribromophenol	80		10-136
4-Terphenyl-d14	72		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-06
 Client ID: SODUP02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 00:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 04/05/23 07:49
 Analyst: MG
 Percent Solids: 65%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 02:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	850		ug/kg	200	26.	1
1,2,4-Trichlorobenzene	ND		ug/kg	250	29.	1
Hexachlorobenzene	ND		ug/kg	150	28.	1
Bis(2-chloroethyl)ether	ND		ug/kg	230	34.	1
2-Chloronaphthalene	ND		ug/kg	250	25.	1
1,2-Dichlorobenzene	ND		ug/kg	250	45.	1
1,3-Dichlorobenzene	ND		ug/kg	250	43.	1
1,4-Dichlorobenzene	ND		ug/kg	250	44.	1
3,3'-Dichlorobenzidine	ND		ug/kg	250	67.	1
2,4-Dinitrotoluene	ND		ug/kg	250	50.	1
2,6-Dinitrotoluene	ND		ug/kg	250	43.	1
Fluoranthene	1800		ug/kg	150	29.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	250	27.	1
4-Bromophenyl phenyl ether	ND		ug/kg	250	38.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	300	43.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	270	25.	1
Hexachlorobutadiene	ND		ug/kg	250	37.	1
Hexachlorocyclopentadiene	ND		ug/kg	720	230	1
Hexachloroethane	ND		ug/kg	200	41.	1
Isophorone	ND		ug/kg	230	33.	1
Naphthalene	5400		ug/kg	250	31.	1
Nitrobenzene	ND		ug/kg	230	37.	1
NDPA/DPA	ND		ug/kg	200	29.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	250	39.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	250	87.	1
Butyl benzyl phthalate	ND		ug/kg	250	64.	1
Di-n-butylphthalate	ND		ug/kg	250	48.	1
Di-n-octylphthalate	ND		ug/kg	250	86.	1

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-06

Date Collected: 03/31/23 00:00

Client ID: SODUP02_033123

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Diethyl phthalate	ND		ug/kg	250	23.	1
Dimethyl phthalate	ND		ug/kg	250	53.	1
Benzo(a)anthracene	1600		ug/kg	150	28.	1
Benzo(a)pyrene	2500		ug/kg	200	62.	1
Benzo(b)fluoranthene	2100		ug/kg	150	42.	1
Benzo(k)fluoranthene	740		ug/kg	150	40.	1
Chrysene	1800		ug/kg	150	26.	1
Acenaphthylene	940		ug/kg	200	39.	1
Anthracene	460		ug/kg	150	49.	1
Benzo(ghi)perylene	1100		ug/kg	200	30.	1
Fluorene	1100		ug/kg	250	24.	1
Phenanthrene	1600		ug/kg	150	31.	1
Dibenzo(a,h)anthracene	300		ug/kg	150	29.	1
Indeno(1,2,3-cd)pyrene	1200		ug/kg	200	35.	1
Pyrene	3400		ug/kg	150	25.	1
Biphenyl	150	J	ug/kg	570	33.	1
4-Chloroaniline	ND		ug/kg	250	46.	1
2-Nitroaniline	ND		ug/kg	250	49.	1
3-Nitroaniline	ND		ug/kg	250	48.	1
4-Nitroaniline	ND		ug/kg	250	100	1
Dibenzofuran	190	J	ug/kg	250	24.	1
2-Methylnaphthalene	300		ug/kg	300	30.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	250	26.	1
Acetophenone	110	J	ug/kg	250	31.	1
2,4,6-Trichlorophenol	ND		ug/kg	150	48.	1
p-Chloro-m-cresol	ND		ug/kg	250	38.	1
2-Chlorophenol	ND		ug/kg	250	30.	1
2,4-Dichlorophenol	ND		ug/kg	230	40.	1
2,4-Dimethylphenol	ND		ug/kg	250	83.	1
2-Nitrophenol	ND		ug/kg	540	95.	1
4-Nitrophenol	ND		ug/kg	350	100	1
2,4-Dinitrophenol	ND		ug/kg	1200	120	1
4,6-Dinitro-o-cresol	ND		ug/kg	660	120	1
Pentachlorophenol	ND		ug/kg	200	55.	1
Phenol	ND		ug/kg	250	38.	1
2-Methylphenol	ND		ug/kg	250	39.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	360	39.	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-06**Date Collected:** 03/31/23 00:00**Client ID:** SODUP02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4,5-Trichlorophenol	ND		ug/kg	250	48.	1
Benzoic Acid	ND		ug/kg	820	260	1
Benzyl Alcohol	ND		ug/kg	250	77.	1
Carbazole	96	J	ug/kg	250	24.	1
1,4-Dioxane	ND		ug/kg	38	12.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	61		25-120
Phenol-d6	62		10-120
Nitrobenzene-d5	62		23-120
2-Fluorobiphenyl	73		30-120
2,4,6-Tribromophenol	86		10-136
4-Terphenyl-d14	76		18-120

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-08
 Client ID: SOFB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E
 Analytical Date: 04/06/23 03:30
 Analyst: CMM

Extraction Method: EPA 3510C
 Extraction Date: 04/05/23 07:33

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50	1
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50	1
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45	1
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40	1
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6	1
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2	1
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50	1
Hexachlorocyclopentadiene	ND		ug/l	20	0.69	1
Isophorone	ND		ug/l	5.0	1.2	1
Nitrobenzene	ND		ug/l	2.0	0.77	1
NDPA/DPA	ND		ug/l	2.0	0.42	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.5	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.2	1
Di-n-butylphthalate	ND		ug/l	5.0	0.39	1
Di-n-octylphthalate	ND		ug/l	5.0	1.3	1
Diethyl phthalate	ND		ug/l	5.0	0.38	1
Dimethyl phthalate	ND		ug/l	5.0	1.8	1
Biphenyl	ND		ug/l	2.0	0.46	1
4-Chloroaniline	ND		ug/l	5.0	1.1	1
2-Nitroaniline	ND		ug/l	5.0	0.50	1
3-Nitroaniline	ND		ug/l	5.0	0.81	1
4-Nitroaniline	ND		ug/l	5.0	0.80	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-08**Date Collected:** 03/31/23 16:00**Client ID:** SOFB02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dibenzofuran	ND		ug/l	2.0	0.50	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44	1
Acetophenone	ND		ug/l	5.0	0.53	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.35	1
2-Chlorophenol	ND		ug/l	2.0	0.48	1
2,4-Dichlorophenol	ND		ug/l	5.0	0.41	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.8	1
2-Nitrophenol	ND		ug/l	10	0.85	1
4-Nitrophenol	ND		ug/l	10	0.67	1
2,4-Dinitrophenol	ND		ug/l	20	6.6	1
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8	1
Phenol	ND		ug/l	5.0	0.57	1
2-Methylphenol	ND		ug/l	5.0	0.49	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77	1
Benzoic Acid	ND		ug/l	50	2.6	1
Benzyl Alcohol	ND		ug/l	2.0	0.59	1
Carbazole	ND		ug/l	2.0	0.49	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	53		21-120
Phenol-d6	39		10-120
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	58		15-120
2,4,6-Tribromophenol	72		10-120
4-Terphenyl-d14	63		41-149

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-08
 Client ID: SOFB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 04/06/23 11:25
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 04/05/23 07:33

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	0.01	1
2-Chloronaphthalene	ND		ug/l	0.20	0.02	1
Fluoranthene	ND		ug/l	0.10	0.02	1
Hexachlorobutadiene	ND		ug/l	0.50	0.05	1
Naphthalene	0.05	J	ug/l	0.10	0.05	1
Benzo(a)anthracene	ND		ug/l	0.10	0.02	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(b)fluoranthene	ND		ug/l	0.10	0.01	1
Benzo(k)fluoranthene	ND		ug/l	0.10	0.01	1
Chrysene	ND		ug/l	0.10	0.01	1
Acenaphthylene	ND		ug/l	0.10	0.01	1
Anthracene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
2-Methylnaphthalene	ND		ug/l	0.10	0.02	1
Pentachlorophenol	0.06	J	ug/l	0.80	0.01	1
Hexachlorobenzene	ND		ug/l	0.80	0.01	1
Hexachloroethane	ND		ug/l	0.80	0.06	1

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-08**Date Collected:** 03/31/23 16:00**Client ID:** SOFB02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	58		21-120
Phenol-d6	49		10-120
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	72		15-120
2,4,6-Tribromophenol	94		10-120
4-Terphenyl-d14	85		41-149

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 01:55
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 04/04/23 02:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1762302-1					
Acenaphthene	ND		ug/kg	130	17.
1,2,4-Trichlorobenzene	ND		ug/kg	160	19.
Hexachlorobenzene	ND		ug/kg	99	18.
Bis(2-chloroethyl)ether	ND		ug/kg	150	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
1,2-Dichlorobenzene	ND		ug/kg	160	30.
1,3-Dichlorobenzene	ND		ug/kg	160	28.
1,4-Dichlorobenzene	ND		ug/kg	160	29.
3,3'-Dichlorobenzidine	ND		ug/kg	160	44.
2,4-Dinitrotoluene	ND		ug/kg	160	33.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	99	19.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	18.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	470	150
Hexachloroethane	ND		ug/kg	130	27.
Isophorone	ND		ug/kg	150	21.
Naphthalene	44	J	ug/kg	160	20.
Nitrobenzene	ND		ug/kg	150	24.
NDPA/DPA	ND		ug/kg	130	19.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	57.
Butyl benzyl phthalate	ND		ug/kg	160	42.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	56.
Diethyl phthalate	ND		ug/kg	160	15.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 01:55
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 04/04/23 02:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1762302-1					
Dimethyl phthalate	ND		ug/kg	160	35.
Benzo(a)anthracene	ND		ug/kg	99	18.
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	99	28.
Benzo(k)fluoranthene	ND		ug/kg	99	26.
Chrysene	ND		ug/kg	99	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	99	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	99	20.
Dibenzo(a,h)anthracene	ND		ug/kg	99	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	23.
Pyrene	ND		ug/kg	99	16.
Biphenyl	ND		ug/kg	380	21.
4-Chloroaniline	ND		ug/kg	160	30.
2-Nitroaniline	ND		ug/kg	160	32.
3-Nitroaniline	ND		ug/kg	160	31.
4-Nitroaniline	ND		ug/kg	160	68.
Dibenzofuran	ND		ug/kg	160	16.
2-Methylnaphthalene	ND		ug/kg	200	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	99	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	20.
2,4-Dichlorophenol	ND		ug/kg	150	26.
2,4-Dimethylphenol	ND		ug/kg	160	54.
2-Nitrophenol	ND		ug/kg	360	62.

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/05/23 01:55
Analyst: LJG

Extraction Method: EPA 3546
Extraction Date: 04/04/23 02:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1762302-1					
4-Nitrophenol	ND		ug/kg	230	67.
2,4-Dinitrophenol	ND		ug/kg	790	77.
4,6-Dinitro-o-cresol	ND		ug/kg	430	79.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	160	25.
2-Methylphenol	ND		ug/kg	160	26.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	26.
2,4,5-Trichlorophenol	ND		ug/kg	160	32.
Benzoic Acid	ND		ug/kg	530	170
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	16.
1,4-Dioxane	ND		ug/kg	25	7.6

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	86		25-120
Phenol-d6	83		10-120
Nitrobenzene-d5	74		23-120
2-Fluorobiphenyl	85		30-120
2,4,6-Tribromophenol	89		10-136
4-Terphenyl-d14	97		18-120

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/06/23 01:23
Analyst: SZ

Extraction Method: EPA 3510C
Extraction Date: 04/05/23 07:25

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG1762884-1					
Acenaphthene	ND		ug/l	2.0	0.44
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50
Hexachlorobenzene	ND		ug/l	2.0	0.46
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50
2-Chloronaphthalene	ND		ug/l	2.0	0.44
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93
Fluoranthene	ND		ug/l	2.0	0.26
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50
Hexachlorobutadiene	ND		ug/l	2.0	0.66
Hexachlorocyclopentadiene	ND		ug/l	20	0.69
Hexachloroethane	ND		ug/l	2.0	0.58
Isophorone	ND		ug/l	5.0	1.2
Naphthalene	ND		ug/l	2.0	0.46
Nitrobenzene	ND		ug/l	2.0	0.77
NDPA/DPA	ND		ug/l	2.0	0.42
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.5
Butyl benzyl phthalate	ND		ug/l	5.0	1.2
Di-n-butylphthalate	ND		ug/l	5.0	0.39
Di-n-octylphthalate	ND		ug/l	5.0	1.3
Diethyl phthalate	ND		ug/l	5.0	0.38

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/06/23 01:23
Analyst: SZ

Extraction Method: EPA 3510C
Extraction Date: 04/05/23 07:25

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG1762884-1					
Dimethyl phthalate	ND		ug/l	5.0	1.8
Benzo(a)anthracene	ND		ug/l	2.0	0.32
Benzo(a)pyrene	ND		ug/l	2.0	0.41
Benzo(b)fluoranthene	ND		ug/l	2.0	0.35
Benzo(k)fluoranthene	ND		ug/l	2.0	0.37
Chrysene	ND		ug/l	2.0	0.34
Acenaphthylene	ND		ug/l	2.0	0.46
Anthracene	ND		ug/l	2.0	0.33
Benzo(ghi)perylene	ND		ug/l	2.0	0.30
Fluorene	ND		ug/l	2.0	0.41
Phenanthrene	ND		ug/l	2.0	0.33
Dibenzo(a,h)anthracene	ND		ug/l	2.0	0.32
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.0	0.40
Pyrene	ND		ug/l	2.0	0.28
Biphenyl	ND		ug/l	2.0	0.46
4-Chloroaniline	ND		ug/l	5.0	1.1
2-Nitroaniline	ND		ug/l	5.0	0.50
3-Nitroaniline	ND		ug/l	5.0	0.81
4-Nitroaniline	ND		ug/l	5.0	0.80
Dibenzofuran	ND		ug/l	2.0	0.50
2-Methylnaphthalene	ND		ug/l	2.0	0.45
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44
Acetophenone	ND		ug/l	5.0	0.53
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61
p-Chloro-m-cresol	ND		ug/l	2.0	0.35
2-Chlorophenol	ND		ug/l	2.0	0.48
2,4-Dichlorophenol	ND		ug/l	5.0	0.41
2,4-Dimethylphenol	ND		ug/l	5.0	1.8
2-Nitrophenol	ND		ug/l	10	0.85

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 04/06/23 01:23
Analyst: SZ

Extraction Method: EPA 3510C
Extraction Date: 04/05/23 07:25

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG1762884-1					
4-Nitrophenol	ND		ug/l	10	0.67
2,4-Dinitrophenol	ND		ug/l	20	6.6
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8
Pentachlorophenol	ND		ug/l	10	1.8
Phenol	ND		ug/l	5.0	0.57
2-Methylphenol	ND		ug/l	5.0	0.49
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77
Benzoic Acid	ND		ug/l	50	2.6
Benzyl Alcohol	ND		ug/l	2.0	0.59
Carbazole	ND		ug/l	2.0	0.49

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	66		21-120
Phenol-d6	50		10-120
Nitrobenzene-d5	77		23-120
2-Fluorobiphenyl	71		15-120
2,4,6-Tribromophenol	81		10-120
4-Terphenyl-d14	71		41-149

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 04/06/23 08:07
Analyst: AH

Extraction Method: EPA 3510C
Extraction Date: 04/05/23 07:26

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 08 Batch: WG1762885-1					
Acenaphthene	ND		ug/l	0.10	0.01
2-Chloronaphthalene	ND		ug/l	0.20	0.02
Fluoranthene	ND		ug/l	0.10	0.02
Hexachlorobutadiene	ND		ug/l	0.50	0.05
Naphthalene	ND		ug/l	0.10	0.05
Benzo(a)anthracene	ND		ug/l	0.10	0.02
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(b)fluoranthene	ND		ug/l	0.10	0.01
Benzo(k)fluoranthene	0.01	J	ug/l	0.10	0.01
Chrysene	ND		ug/l	0.10	0.01
Acenaphthylene	ND		ug/l	0.10	0.01
Anthracene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.10	0.02
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
2-Methylnaphthalene	ND		ug/l	0.10	0.02
Pentachlorophenol	0.18	J	ug/l	0.80	0.01
Hexachlorobenzene	ND		ug/l	0.80	0.01
Hexachloroethane	ND		ug/l	0.80	0.06

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 04/06/23 08:07
Analyst: AH

Extraction Method: EPA 3510C
Extraction Date: 04/05/23 07:26

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 08 Batch: WG1762885-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	71		21-120
Phenol-d6	58		10-120
Nitrobenzene-d5	95		23-120
2-Fluorobiphenyl	84		15-120
2,4,6-Tribromophenol	99		10-120
4-Terphenyl-d14	84		41-149

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1762302-2 WG1762302-3								
Acenaphthene	66		77		31-137	15		50
1,2,4-Trichlorobenzene	70		79		38-107	12		50
Hexachlorobenzene	76		91		40-140	18		50
Bis(2-chloroethyl)ether	62		74		40-140	18		50
2-Chloronaphthalene	70		85		40-140	19		50
1,2-Dichlorobenzene	65		78		40-140	18		50
1,3-Dichlorobenzene	63		77		40-140	20		50
1,4-Dichlorobenzene	63		76		28-104	19		50
3,3'-Dichlorobenzidine	58		64		40-140	10		50
2,4-Dinitrotoluene	76		88		40-132	15		50
2,6-Dinitrotoluene	72		86		40-140	18		50
Fluoranthene	74		86		40-140	15		50
4-Chlorophenyl phenyl ether	72		84		40-140	15		50
4-Bromophenyl phenyl ether	76		88		40-140	15		50
Bis(2-chloroisopropyl)ether	52		63		40-140	19		50
Bis(2-chloroethoxy)methane	67		76		40-117	13		50
Hexachlorobutadiene	64		76		40-140	17		50
Hexachlorocyclopentadiene	74		88		40-140	17		50
Hexachloroethane	54		65		40-140	18		50
Isophorone	63		74		40-140	16		50
Naphthalene	71		84		40-140	17		50
Nitrobenzene	62		72		40-140	15		50
NDPA/DPA	74		87		36-157	16		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1762302-2 WG1762302-3								
n-Nitrosodi-n-propylamine	61		72		32-121	17		50
Bis(2-ethylhexyl)phthalate	70		82		40-140	16		50
Butyl benzyl phthalate	74		85		40-140	14		50
Di-n-butylphthalate	74		85		40-140	14		50
Di-n-octylphthalate	70		83		40-140	17		50
Diethyl phthalate	69		80		40-140	15		50
Dimethyl phthalate	70		83		40-140	17		50
Benzo(a)anthracene	72		84		40-140	15		50
Benzo(a)pyrene	84		101		40-140	18		50
Benzo(b)fluoranthene	75		90		40-140	18		50
Benzo(k)fluoranthene	80		95		40-140	17		50
Chrysene	71		83		40-140	16		50
Acenaphthylene	77		91		40-140	17		50
Anthracene	73		87		40-140	18		50
Benzo(ghi)perylene	73		82		40-140	12		50
Fluorene	71		84		40-140	17		50
Phenanthrene	72		84		40-140	15		50
Dibenzo(a,h)anthracene	78		86		40-140	10		50
Indeno(1,2,3-cd)pyrene	76		85		40-140	11		50
Pyrene	74		85		35-142	14		50
Biphenyl	72		86		37-127	18		50
4-Chloroaniline	47		48		40-140	2		50
2-Nitroaniline	75		88		47-134	16		50

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1762302-2 WG1762302-3								
3-Nitroaniline	53		59		26-129	11		50
4-Nitroaniline	73		82		41-125	12		50
Dibenzofuran	72		84		40-140	15		50
2-Methylnaphthalene	70		84		40-140	18		50
1,2,4,5-Tetrachlorobenzene	72		86		40-117	18		50
Acetophenone	70		84		14-144	18		50
2,4,6-Trichlorophenol	79		94		30-130	17		50
p-Chloro-m-cresol	70		83		26-103	17		50
2-Chlorophenol	67		80		25-102	18		50
2,4-Dichlorophenol	76		83		30-130	9		50
2,4-Dimethylphenol	69		78		30-130	12		50
2-Nitrophenol	71		81		30-130	13		50
4-Nitrophenol	69		79		11-114	14		50
2,4-Dinitrophenol	73		84		4-130	14		50
4,6-Dinitro-o-cresol	79		90		10-130	13		50
Pentachlorophenol	84		98		17-109	15		50
Phenol	72		88		26-90	20		50
2-Methylphenol	68		82		30-130.	19		50
3-Methylphenol/4-Methylphenol	71		84		30-130	17		50
2,4,5-Trichlorophenol	81		98		30-130	19		50
Benzoic Acid	60		62		10-110	3		50
Benzyl Alcohol	68		81		40-140	17		50
Carbazole	76		88		54-128	15		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1762302-2 WG1762302-3								
1,4-Dioxane	38	Q	45		40-140	17		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	71		86		25-120
Phenol-d6	70		85		10-120
Nitrobenzene-d5	64		74		23-120
2-Fluorobiphenyl	73		88		30-120
2,4,6-Tribromophenol	84		101		10-136
4-Terphenyl-d14	78		92		18-120

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG1762884-2 WG1762884-3								
Acenaphthene	60		51		37-111	16		30
1,2,4-Trichlorobenzene	56		49		39-98	13		30
Hexachlorobenzene	57		49		40-140	15		30
Bis(2-chloroethyl)ether	61		54		40-140	12		30
2-Chloronaphthalene	56		51		40-140	9		30
1,2-Dichlorobenzene	54		48		40-140	12		30
1,3-Dichlorobenzene	52		47		40-140	10		30
1,4-Dichlorobenzene	52		48		36-97	8		30
3,3'-Dichlorobenzidine	51		50		40-140	2		30
2,4-Dinitrotoluene	70		66		48-143	6		30
2,6-Dinitrotoluene	65		62		40-140	5		30
Fluoranthene	62		56		40-140	10		30
4-Chlorophenyl phenyl ether	57		53		40-140	7		30
4-Bromophenyl phenyl ether	58		51		40-140	13		30
Bis(2-chloroisopropyl)ether	67		57		40-140	16		30
Bis(2-chloroethoxy)methane	62		56		40-140	10		30
Hexachlorobutadiene	51		45		40-140	13		30
Hexachlorocyclopentadiene	55		49		40-140	12		30
Hexachloroethane	55		49		40-140	12		30
Isophorone	60		53		40-140	12		30
Naphthalene	55		50		40-140	10		30
Nitrobenzene	65		60		40-140	8		30
NDPA/DPA	60		54		40-140	11		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG1762884-2 WG1762884-3								
n-Nitrosodi-n-propylamine	59		54		29-132	9		30
Bis(2-ethylhexyl)phthalate	78		73		40-140	7		30
Butyl benzyl phthalate	92		89		40-140	3		30
Di-n-butylphthalate	68		66		40-140	3		30
Di-n-octylphthalate	75		72		40-140	4		30
Diethyl phthalate	65		61		40-140	6		30
Dimethyl phthalate	64		59		40-140	8		30
Benzo(a)anthracene	67		60		40-140	11		30
Benzo(a)pyrene	65		56		40-140	15		30
Benzo(b)fluoranthene	71		60		40-140	17		30
Benzo(k)fluoranthene	61		54		40-140	12		30
Chrysene	59		52		40-140	13		30
Acenaphthylene	61		56		45-123	9		30
Anthracene	63		56		40-140	12		30
Benzo(ghi)perylene	70		61		40-140	14		30
Fluorene	60		54		40-140	11		30
Phenanthrene	60		54		40-140	11		30
Dibenzo(a,h)anthracene	71		63		40-140	12		30
Indeno(1,2,3-cd)pyrene	77		69		40-140	11		30
Pyrene	59		54		26-127	9		30
Biphenyl	56		51		40-140	9		30
4-Chloroaniline	53		48		40-140	10		30
2-Nitroaniline	76		71		52-143	7		30

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG1762884-2 WG1762884-3								
3-Nitroaniline	69		57		25-145	19		30
4-Nitroaniline	65		58		51-143	11		30
Dibenzofuran	60		51		40-140	16		30
2-Methylnaphthalene	58		52		40-140	11		30
1,2,4,5-Tetrachlorobenzene	51		47		2-134	8		30
Acetophenone	61		53		39-129	14		30
2,4,6-Trichlorophenol	70		62		30-130	12		30
p-Chloro-m-cresol	68		61		23-97	11		30
2-Chlorophenol	65		57		27-123	13		30
2,4-Dichlorophenol	65		58		30-130	11		30
2,4-Dimethylphenol	57		51		30-130	11		30
2-Nitrophenol	90		84		30-130	7		30
4-Nitrophenol	68		61		10-80	11		30
2,4-Dinitrophenol	73		82		20-130	12		30
4,6-Dinitro-o-cresol	93		90		20-164	3		30
Pentachlorophenol	65		65		9-103	0		30
Phenol	49		42		12-110	15		30
2-Methylphenol	62		54		30-130	14		30
3-Methylphenol/4-Methylphenol	69		60		30-130	14		30
2,4,5-Trichlorophenol	68		62		30-130	9		30
Benzoic Acid	39		50		10-164	25		30
Benzyl Alcohol	67		57		26-116	16		30
Carbazole	65		59		55-144	10		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG1762884-2 WG1762884-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	56		49		21-120
Phenol-d6	45		39		10-120
Nitrobenzene-d5	65		61		23-120
2-Fluorobiphenyl	56		52		15-120
2,4,6-Tribromophenol	75		69		10-120
4-Terphenyl-d14	57		52		41-149

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 08 Batch: WG1762885-2 WG1762885-3								
Acenaphthene	52		58		40-140	11		40
2-Chloronaphthalene	51		57		40-140	11		40
Fluoranthene	58		66		40-140	13		40
Hexachlorobutadiene	43		47		40-140	9		40
Naphthalene	48		54		40-140	12		40
Benzo(a)anthracene	61		68		40-140	11		40
Benzo(a)pyrene	60		67		40-140	11		40
Benzo(b)fluoranthene	62		66		40-140	6		40
Benzo(k)fluoranthene	61		67		40-140	9		40
Chrysene	56		63		40-140	12		40
Acenaphthylene	55		62		40-140	12		40
Anthracene	58		64		40-140	10		40
Benzo(ghi)perylene	61		70		40-140	14		40
Fluorene	56		62		40-140	10		40
Phenanthrene	54		60		40-140	11		40
Dibenzo(a,h)anthracene	62		70		40-140	12		40
Indeno(1,2,3-cd)pyrene	65		75		40-140	14		40
Pyrene	56		65		40-140	15		40
2-Methylnaphthalene	50		56		40-140	11		40
Pentachlorophenol	64		76		40-140	17		40
Hexachlorobenzene	44		48		40-140	9		40
Hexachloroethane	45		50		40-140	11		40

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 08 Batch: WG1762885-2 WG1762885-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	47		52		21-120
Phenol-d6	40		45		10-120
Nitrobenzene-d5	57		65		23-120
2-Fluorobiphenyl	51		57		15-120
2,4,6-Tribromophenol	69		68		10-120
4-Terphenyl-d14	53		62		41-149

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1762302-4 WG1762302-5 QC Sample: L2317033-03 Client ID: SB01_0-2												
Acenaphthene	ND	1440	1300	90		850	58		31-137	42		50
1,2,4-Trichlorobenzene	ND	1440	1400	97		900	62		38-107	43		50
Hexachlorobenzene	ND	1440	1400	97		960	66		40-140	37		50
Bis(2-chloroethyl)ether	ND	1440	1300	90		760	52		40-140	52	Q	50
2-Chloronaphthalene	ND	1440	1400	97		900	62		40-140	43		50
1,2-Dichlorobenzene	ND	1440	1300	90		900	62		40-140	36		50
1,3-Dichlorobenzene	ND	1440	1200	83		860	59		40-140	33		50
1,4-Dichlorobenzene	ND	1440	1200	83		840	58		28-104	35		50
3,3'-Dichlorobenzidine	ND	1440	1100	76		730	50		40-140	40		50
2,4-Dinitrotoluene	ND	1440	1400	97		960	66		40-132	37		50
2,6-Dinitrotoluene	ND	1440	1400	97		920	63		40-140	41		50
Fluoranthene	ND	1440	1400	97		900	62		40-140	43		50
4-Chlorophenyl phenyl ether	ND	1440	1400	97		910	62		40-140	42		50
4-Bromophenyl phenyl ether	ND	1440	1400	97		970	66		40-140	36		50
Bis(2-chloroisopropyl)ether	ND	1440	1100	76		720	49		40-140	42		50
Bis(2-chloroethoxy)methane	ND	1440	1300	90		880	60		40-117	39		50
Hexachlorobutadiene	ND	1440	1200	83		810	55		40-140	39		50
Hexachlorocyclopentadiene	ND	1440	1400	97		900	62		40-140	43		50
Hexachloroethane	ND	1440	1000	69		740	51		40-140	30		50
Isophorone	ND	1440	1200	83		840	58		40-140	35		50
Naphthalene	35J	1440	1600	110		960	66		40-140	50		50
Nitrobenzene	ND	1440	1300	90		840	58		40-140	43		50
NDPA/DPA	ND	1440	1400	97		930	64		36-157	40		50

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1762302-4 WG1762302-5 QC Sample: L2317033-03 Client ID: SB01_0-2												
n-Nitrosodi-n-propylamine	ND	1440	1200	83		800	55		32-121	40		50
Bis(2-ethylhexyl)phthalate	ND	1440	1300	90		1500	100		40-140	14		50
Butyl benzyl phthalate	ND	1440	1400	97		860	59		40-140	48		50
Di-n-butylphthalate	ND	1440	1400	97		870	60		40-140	47		50
Di-n-octylphthalate	ND	1440	1400	97		860	59		40-140	48		50
Diethyl phthalate	ND	1440	1300	90		860	59		40-140	41		50
Dimethyl phthalate	ND	1440	1400	97		890	61		40-140	45		50
Benzo(a)anthracene	ND	1440	1300	90		870	60		40-140	40		50
Benzo(a)pyrene	ND	1440	1600	110		1000	69		40-140	46		50
Benzo(b)fluoranthene	ND	1440	1400	97		940	64		40-140	39		50
Benzo(k)fluoranthene	ND	1440	1500	100		950	65		40-140	45		50
Chrysene	ND	1440	1300	90		850	58		40-140	42		50
Acenaphthylene	ND	1440	1500	100		980	67		40-140	42		50
Anthracene	ND	1440	1400	97		890	61		40-140	45		50
Benzo(ghi)perylene	ND	1440	1300	90		850	58		40-140	42		50
Fluorene	ND	1440	1400	97		910	62		40-140	42		50
Phenanthrene	ND	1440	1300	90		890	61		40-140	37		50
Dibenzo(a,h)anthracene	ND	1440	1400	97		890	61		40-140	45		50
Indeno(1,2,3-cd)pyrene	ND	1440	1400	97		880	60		40-140	46		50
Pyrene	ND	1440	1400	97		870	60		35-142	47		50
Biphenyl	ND	1440	1400	97		900	62		37-127	43		50
4-Chloroaniline	ND	1440	850	59		560	38	Q	40-140	41		50
2-Nitroaniline	ND	1440	1400	97		950	65		47-134	38		50

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1762302-4 WG1762302-5 QC Sample: L2317033-03 Client ID: SB01_0-2												
3-Nitroaniline	ND	1440	1000	69		740	51		26-129	30		50
4-Nitroaniline	ND	1440	1400	97		870	60		41-125	47		50
Dibenzofuran	ND	1440	1400	97		930	64		40-140	40		50
2-Methylnaphthalene	ND	1440	1400	97		910	62		40-140	42		50
1,2,4,5-Tetrachlorobenzene	ND	1440	1400	97		940	64		40-117	39		50
Acetophenone	ND	1440	1400	97		930	64		14-144	40		50
2,4,6-Trichlorophenol	ND	1440	1600	110		1000	69		30-130	46		50
p-Chloro-m-cresol	ND	1440	1400	97		910	62		26-103	42		50
2-Chlorophenol	ND	1440	1400	97		880	60		25-102	46		50
2,4-Dichlorophenol	ND	1440	1400	97		940	64		30-130	39		50
2,4-Dimethylphenol	ND	1440	1300	90		870	60		30-130	40		50
2-Nitrophenol	ND	1440	1400	97		950	65		30-130	38		50
4-Nitrophenol	ND	1440	1300	90		860	59		11-114	41		50
2,4-Dinitrophenol	ND	1440	1200	83		770J	53		4-130	44		50
4,6-Dinitro-o-cresol	ND	1440	1500	100		990	68		10-130	41		50
Pentachlorophenol	ND	1440	1700	120	Q	1100	75		17-109	43		50
Phenol	ND	1440	1400	97	Q	950	65		26-90	38		50
2-Methylphenol	ND	1440	1400	97		900	62		30-130	43		50
3-Methylphenol/4-Methylphenol	ND	1440	1400	97		930	64		30-130	40		50
2,4,5-Trichlorophenol	ND	1440	1600	110		1000	69		30-130	46		50
Benzoic Acid	ND	1440	410J	28		210J	14		10-110	65	Q	50
Benzyl Alcohol	ND	1440	1300	90		890	61		40-140	37		50
Carbazole	ND	1440	1500	100		930	64		54-128	47		50

Matrix Spike Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1762302-4 WG1762302-5 QC Sample: L2317033-03 Client ID: SB01_0-2												
1,4-Dioxane	ND	1440	740	51		570	39	Q	40-140	26		50

Surrogate	MS		MSD		Acceptance Criteria
	% Recovery	Qualifier	% Recovery	Qualifier	
2,4,6-Tribromophenol	115		72		10-136
2-Fluorobiphenyl	95		61		30-120
2-Fluorophenol	99		63		25-120
4-Terphenyl-d14	92		60		18-120
Nitrobenzene-d5	88		58		23-120
Phenol-d6	95		61		10-120

PCBS

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-03
 Client ID: SB01_0-2
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 14:20
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8082A
 Analytical Date: 04/05/23 09:37
 Analyst: MEO
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 03:20
 Cleanup Method: EPA 3665A
 Cleanup Date: 04/04/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/05/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	35.6	3.16	1	A
Aroclor 1221	ND		ug/kg	35.6	3.57	1	A
Aroclor 1232	ND		ug/kg	35.6	7.55	1	A
Aroclor 1242	ND		ug/kg	35.6	4.80	1	A
Aroclor 1248	ND		ug/kg	35.6	5.34	1	A
Aroclor 1254	4.70	J	ug/kg	35.6	3.90	1	B
Aroclor 1260	ND		ug/kg	35.6	6.58	1	A
Aroclor 1262	ND		ug/kg	35.6	4.52	1	A
Aroclor 1268	ND		ug/kg	35.6	3.69	1	A
PCBs, Total	4.70	J	ug/kg	35.6	3.16	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		30-150	A
Decachlorobiphenyl	82		30-150	A
2,4,5,6-Tetrachloro-m-xylene	89		30-150	B
Decachlorobiphenyl	82		30-150	B

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-04
 Client ID: SB01_9-11
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 11:55
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8082A
 Analytical Date: 04/05/23 10:02
 Analyst: MEO
 Percent Solids: 61%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 03:20
 Cleanup Method: EPA 3665A
 Cleanup Date: 04/04/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/05/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	53.5	4.75	1	A
Aroclor 1221	ND		ug/kg	53.5	5.36	1	A
Aroclor 1232	ND		ug/kg	53.5	11.3	1	A
Aroclor 1242	ND		ug/kg	53.5	7.21	1	A
Aroclor 1248	ND		ug/kg	53.5	8.02	1	A
Aroclor 1254	ND		ug/kg	53.5	5.85	1	A
Aroclor 1260	ND		ug/kg	53.5	9.88	1	A
Aroclor 1262	ND		ug/kg	53.5	6.79	1	A
Aroclor 1268	ND		ug/kg	53.5	5.54	1	A
PCBs, Total	ND		ug/kg	53.5	4.75	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	54		30-150	A
Decachlorobiphenyl	49		30-150	A
2,4,5,6-Tetrachloro-m-xylene	53		30-150	B
Decachlorobiphenyl	50		30-150	B

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-06
 Client ID: SODUP02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 00:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8082A
 Analytical Date: 04/05/23 10:11
 Analyst: MEO
 Percent Solids: 65%

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 03:20
 Cleanup Method: EPA 3665A
 Cleanup Date: 04/04/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/05/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	48.5	4.30	1	A
Aroclor 1221	ND		ug/kg	48.5	4.86	1	A
Aroclor 1232	ND		ug/kg	48.5	10.3	1	A
Aroclor 1242	ND		ug/kg	48.5	6.54	1	A
Aroclor 1248	ND		ug/kg	48.5	7.27	1	A
Aroclor 1254	ND		ug/kg	48.5	5.30	1	A
Aroclor 1260	ND		ug/kg	48.5	8.96	1	A
Aroclor 1262	ND		ug/kg	48.5	6.16	1	A
Aroclor 1268	ND		ug/kg	48.5	5.02	1	A
PCBs, Total	ND		ug/kg	48.5	4.30	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76		30-150	A
Decachlorobiphenyl	71		30-150	A
2,4,5,6-Tetrachloro-m-xylene	68		30-150	B
Decachlorobiphenyl	69		30-150	B

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-08
 Client ID: SOFB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8082A
 Analytical Date: 04/08/23 09:17
 Analyst: JM

Extraction Method: EPA 3510C
 Extraction Date: 04/07/23 19:43
 Cleanup Method: EPA 3665A
 Cleanup Date: 04/08/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/08/23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.071	0.061	1	A
Aroclor 1221	ND		ug/l	0.071	0.061	1	A
Aroclor 1232	ND		ug/l	0.071	0.061	1	A
Aroclor 1242	ND		ug/l	0.071	0.061	1	A
Aroclor 1248	ND		ug/l	0.071	0.061	1	A
Aroclor 1254	ND		ug/l	0.071	0.061	1	A
Aroclor 1260	ND		ug/l	0.071	0.061	1	B
Aroclor 1262	ND		ug/l	0.071	0.061	1	A
Aroclor 1268	ND		ug/l	0.071	0.061	1	A
PCBs, Total	ND		ug/l	0.071	0.061	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	96		30-150	A
Decachlorobiphenyl	88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	82		30-150	B

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
 Analytical Date: 04/05/23 09:12
 Analyst: MEO

Extraction Method: EPA 3546
 Extraction Date: 04/04/23 03:20
 Cleanup Method: EPA 3665A
 Cleanup Date: 04/04/23
 Cleanup Method: EPA 3660B
 Cleanup Date: 04/05/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 03-04,06 Batch: WG1762310-1						
Aroclor 1016	ND		ug/kg	32.1	2.85	A
Aroclor 1221	ND		ug/kg	32.1	3.22	A
Aroclor 1232	ND		ug/kg	32.1	6.80	A
Aroclor 1242	ND		ug/kg	32.1	4.33	A
Aroclor 1248	ND		ug/kg	32.1	4.81	A
Aroclor 1254	ND		ug/kg	32.1	3.51	A
Aroclor 1260	ND		ug/kg	32.1	5.93	A
Aroclor 1262	ND		ug/kg	32.1	4.08	A
Aroclor 1268	ND		ug/kg	32.1	3.32	A
PCBs, Total	ND		ug/kg	32.1	2.85	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	84		30-150	A
Decachlorobiphenyl	78		30-150	A
2,4,5,6-Tetrachloro-m-xylene	86		30-150	B
Decachlorobiphenyl	78		30-150	B

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8082A
Analytical Date: 04/08/23 08:51
Analyst: JM

Extraction Method: EPA 3510C
Extraction Date: 04/07/23 19:43
Cleanup Method: EPA 3665A
Cleanup Date: 04/08/23
Cleanup Method: EPA 3660B
Cleanup Date: 04/08/23

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 08 Batch: WG1764188-1						
Aroclor 1016	ND		ug/l	0.071	0.061	A
Aroclor 1221	ND		ug/l	0.071	0.061	A
Aroclor 1232	ND		ug/l	0.071	0.061	A
Aroclor 1242	ND		ug/l	0.071	0.061	A
Aroclor 1248	ND		ug/l	0.071	0.061	A
Aroclor 1260	ND		ug/l	0.071	0.061	A
Aroclor 1262	ND		ug/l	0.071	0.061	A
Aroclor 1268	ND		ug/l	0.071	0.061	A
Aroclor 1254	ND		ug/l	0.071	0.061	B
PCBs, Total	ND		ug/l	0.071	0.061	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	108		30-150	A
Decachlorobiphenyl	133		30-150	A
2,4,5,6-Tetrachloro-m-xylene	102		30-150	B
Decachlorobiphenyl	129		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 03-04,06 Batch: WG1762310-2 WG1762310-3									
Aroclor 1016	80		75		40-140	6		50	A
Aroclor 1260	70		66		40-140	6		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		89		30-150	A
Decachlorobiphenyl	90		82		30-150	A
2,4,5,6-Tetrachloro-m-xylene	95		89		30-150	B
Decachlorobiphenyl	92		85		30-150	B

Lab Control Sample Analysis**Batch Quality Control****Project Name:** 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 08 Batch: WG1764188-2 WG1764188-3									
Aroclor 1016	74		73		40-140	1		50	A
Aroclor 1260	67		69		40-140	3		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	104		76		30-150	A
Decachlorobiphenyl	142		88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	98		70		30-150	B
Decachlorobiphenyl	144		87		30-150	B

Matrix Spike Analysis*Batch Quality Control***Project Name:** 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 03-04,06 QC Batch ID: WG1762310-4 WG1762310-5 QC Sample: L2317033-03 Client ID: SB01_0-2													
Aroclor 1016	ND	221	178	81		140	64		40-140	24		50	A
Aroclor 1260	ND	221	156	71		125	57		40-140	22		50	A

Surrogate	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		74		30-150	A
Decachlorobiphenyl	88		71		30-150	A
2,4,5,6-Tetrachloro-m-xylene	94		73		30-150	B
Decachlorobiphenyl	87		70		30-150	B

PESTICIDES

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-08
 Client ID: SOFB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8081B
 Analytical Date: 04/06/23 14:15
 Analyst: EJJ

Extraction Method: EPA 3510C
 Extraction Date: 04/05/23 08:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/l	0.014	0.003	1	A
Lindane	ND		ug/l	0.014	0.003	1	A
Alpha-BHC	ND		ug/l	0.014	0.003	1	A
Beta-BHC	ND		ug/l	0.014	0.004	1	A
Heptachlor	ND		ug/l	0.014	0.002	1	A
Aldrin	ND		ug/l	0.014	0.002	1	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	1	A
Endrin	ND		ug/l	0.029	0.003	1	A
Endrin aldehyde	ND		ug/l	0.029	0.006	1	A
Endrin ketone	ND		ug/l	0.029	0.003	1	A
Dieldrin	ND		ug/l	0.029	0.003	1	A
4,4'-DDE	ND		ug/l	0.029	0.003	1	A
4,4'-DDD	ND		ug/l	0.029	0.003	1	A
4,4'-DDT	0.013	J	ug/l	0.029	0.003	1	A
Endosulfan I	ND		ug/l	0.014	0.002	1	A
Endosulfan II	ND		ug/l	0.029	0.004	1	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	1	A
Methoxychlor	ND		ug/l	0.143	0.005	1	A
Toxaphene	ND		ug/l	0.143	0.045	1	A
cis-Chlordane	ND		ug/l	0.014	0.005	1	A
trans-Chlordane	ND		ug/l	0.014	0.004	1	A
Chlordane	ND		ug/l	0.143	0.033	1	A

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-08**Date Collected:** 03/31/23 16:00**Client ID:** SOFB02_033123**Date Received:** 03/31/23**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Field Prep:** Not Specified**Sample Depth:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	43		30-150	A
Decachlorobiphenyl	36		30-150	A
2,4,5,6-Tetrachloro-m-xylene	43		30-150	B
Decachlorobiphenyl	38		30-150	B

Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23**SAMPLE RESULTS**

Lab ID: L2317033-08
 Client ID: SOFB02_033123
 Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00
 Date Received: 03/31/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8151A
 Analytical Date: 04/03/23 20:06
 Analyst: AAR

Extraction Method: EPA 8151A
 Extraction Date: 04/02/23 14:50

Methylation Date: 04/03/23 06:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/l	10.0	0.498	1	A
2,4,5-T	ND		ug/l	2.00	0.531	1	A
2,4,5-TP (Silvex)	ND		ug/l	2.00	0.539	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	82		30-150	A
DCAA	79		30-150	B

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8151A
Analytical Date: 04/03/23 19:10
Analyst: AAR

Extraction Method: EPA 8151A
Extraction Date: 04/02/23 14:50

Methylation Date: 04/03/23 06:55

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 08 Batch: WG1761802-1						
2,4-D	ND		ug/l	10.0	0.498	A
2,4,5-T	ND		ug/l	2.00	0.531	A
2,4,5-TP (Silvex)	ND		ug/l	2.00	0.539	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	87		30-150	A
DCAA	82		30-150	B

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 04/06/23 13:37
Analyst: EJJ

Extraction Method: EPA 3510C
Extraction Date: 04/05/23 08:45

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 08 Batch: WG1762972-1						
Delta-BHC	ND		ug/l	0.014	0.003	A
Lindane	ND		ug/l	0.014	0.003	A
Alpha-BHC	ND		ug/l	0.014	0.003	A
Beta-BHC	ND		ug/l	0.014	0.004	A
Heptachlor	ND		ug/l	0.014	0.002	A
Aldrin	ND		ug/l	0.014	0.002	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	A
Endrin	ND		ug/l	0.029	0.003	A
Endrin aldehyde	ND		ug/l	0.029	0.006	A
Endrin ketone	ND		ug/l	0.029	0.003	A
Dieldrin	ND		ug/l	0.029	0.003	A
4,4'-DDE	ND		ug/l	0.029	0.003	A
4,4'-DDD	ND		ug/l	0.029	0.003	A
4,4'-DDT	ND		ug/l	0.029	0.003	A
Endosulfan I	ND		ug/l	0.014	0.002	A
Endosulfan II	ND		ug/l	0.029	0.004	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	A
Methoxychlor	ND		ug/l	0.143	0.005	A
Toxaphene	ND		ug/l	0.143	0.045	A
cis-Chlordane	ND		ug/l	0.014	0.005	A
trans-Chlordane	ND		ug/l	0.014	0.004	A
Chlordane	ND		ug/l	0.143	0.033	A

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
 Analytical Date: 04/06/23 13:37
 Analyst: EJJ

Extraction Method: EPA 3510C
 Extraction Date: 04/05/23 08:45

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 08 Batch: WG1762972-1						

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	59		30-150	A
Decachlorobiphenyl	54		30-150	A
2,4,5,6-Tetrachloro-m-xylene	54		30-150	B
Decachlorobiphenyl	50		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 08 Batch: WG1761802-2 WG1761802-3									
2,4-D	90		89		30-150	1		25	A
2,4,5-T	92		95		30-150	3		25	A
2,4,5-TP (Silvex)	89		92		30-150	3		25	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	78		82		30-150	A
DCAA	88		92		30-150	B

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 08 Batch: WG1762972-2 WG1762972-3									
Delta-BHC	41		52		30-150	25	Q	20	A
Lindane	45		57		30-150	25	Q	20	A
Alpha-BHC	48		62		30-150	25	Q	20	A
Beta-BHC	44		55		30-150	22	Q	20	A
Heptachlor	49		63		30-150	25	Q	20	A
Aldrin	45		59		30-150	26	Q	20	A
Heptachlor epoxide	47		60		30-150	25	Q	20	A
Endrin	45		59		30-150	27	Q	20	A
Endrin aldehyde	43		57		30-150	28	Q	20	A
Endrin ketone	47		64		30-150	32	Q	20	A
Dieldrin	50		64		30-150	26	Q	20	A
4,4'-DDE	44		57		30-150	26	Q	20	A
4,4'-DDD	47		63		30-150	30	Q	20	A
4,4'-DDT	53		63		30-150	17		20	A
Endosulfan I	46		59		30-150	26	Q	20	A
Endosulfan II	46		62		30-150	30	Q	20	A
Endosulfan sulfate	43		58		30-150	29	Q	20	A
Methoxychlor	52		65		30-150	23	Q	20	A
cis-Chlordane	40		52		30-150	26	Q	20	A
trans-Chlordane	49		64		30-150	27	Q	20	A

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 08 Batch: WG1762972-2 WG1762972-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	42		54		30-150	A
Decachlorobiphenyl	39		55		30-150	A
2,4,5,6-Tetrachloro-m-xylene	41		53		30-150	B
Decachlorobiphenyl	38		51		30-150	B

METALS

Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-01

Date Collected: 03/31/23 09:50

Client ID: SB05_6-8

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	1270		mg/kg	8.95	2.42	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Antimony, Total	ND		mg/kg	4.47	0.340	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Arsenic, Total	1.20		mg/kg	0.895	0.186	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Barium, Total	6.46		mg/kg	0.895	0.156	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Beryllium, Total	0.051	J	mg/kg	0.447	0.030	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Cadmium, Total	ND		mg/kg	0.895	0.088	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Calcium, Total	232		mg/kg	8.95	3.13	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Chromium, Total	2.91		mg/kg	0.895	0.086	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Cobalt, Total	0.839	J	mg/kg	1.79	0.148	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Copper, Total	1.52		mg/kg	0.895	0.231	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Iron, Total	2710		mg/kg	4.47	0.808	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Lead, Total	10.5		mg/kg	4.47	0.240	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Magnesium, Total	420		mg/kg	8.95	1.38	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Manganese, Total	18.2		mg/kg	0.895	0.142	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Mercury, Total	0.058	J	mg/kg	0.076	0.050	1	04/05/23 18:12	04/05/23 22:52	EPA 7471B	1,7471B	TAA
Nickel, Total	4.55		mg/kg	2.24	0.216	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Potassium, Total	150	J	mg/kg	224	12.9	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Selenium, Total	ND		mg/kg	1.79	0.231	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Silver, Total	ND		mg/kg	0.447	0.253	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Sodium, Total	51.6	J	mg/kg	179	2.82	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Thallium, Total	ND		mg/kg	1.79	0.282	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Vanadium, Total	3.66		mg/kg	0.895	0.182	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL
Zinc, Total	15.4		mg/kg	4.47	0.262	2	04/05/23 17:34	04/06/23 13:32	EPA 3050B	1,6010D	DHL

General Chemistry - Mansfield Lab

Chromium, Trivalent	2.91		mg/kg	0.936	0.936	1		04/07/23 16:41	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-02

Date Collected: 03/31/23 10:00

Client ID: SB05_8-10

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	1460		mg/kg	8.94	2.41	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Antimony, Total	ND		mg/kg	4.47	0.340	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Arsenic, Total	0.958		mg/kg	0.894	0.186	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Barium, Total	2.32		mg/kg	0.894	0.156	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Beryllium, Total	0.077	J	mg/kg	0.447	0.030	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Cadmium, Total	ND		mg/kg	0.894	0.088	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Calcium, Total	379		mg/kg	8.94	3.13	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Chromium, Total	4.39		mg/kg	0.894	0.086	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Cobalt, Total	1.40	J	mg/kg	1.79	0.148	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Copper, Total	1.61		mg/kg	0.894	0.231	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Iron, Total	3280		mg/kg	4.47	0.807	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Lead, Total	1.73	J	mg/kg	4.47	0.240	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Magnesium, Total	523		mg/kg	8.94	1.38	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Manganese, Total	27.2		mg/kg	0.894	0.142	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Mercury, Total	ND		mg/kg	0.076	0.050	1	04/05/23 18:12	04/05/23 22:55	EPA 7471B	1,7471B	TAA
Nickel, Total	4.86		mg/kg	2.24	0.216	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Potassium, Total	150	J	mg/kg	224	12.9	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Selenium, Total	ND		mg/kg	1.79	0.231	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Silver, Total	ND		mg/kg	0.447	0.253	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Sodium, Total	33.3	J	mg/kg	179	2.82	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Thallium, Total	ND		mg/kg	1.79	0.282	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Vanadium, Total	5.22		mg/kg	0.894	0.182	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL
Zinc, Total	7.27		mg/kg	4.47	0.262	2	04/05/23 17:34	04/06/23 13:54	EPA 3050B	1,6010D	DHL

General Chemistry - Mansfield Lab

Chromium, Trivalent	4.39		mg/kg	0.946	0.946	1		04/07/23 16:41	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-03

Date Collected: 03/31/23 14:20

Client ID: SB01_0-2

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	12200		mg/kg	8.34	2.25	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Antimony, Total	ND		mg/kg	4.17	0.317	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Arsenic, Total	2.05		mg/kg	0.834	0.174	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Barium, Total	126		mg/kg	0.834	0.145	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Beryllium, Total	0.242	J	mg/kg	0.417	0.028	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Cadmium, Total	ND		mg/kg	0.834	0.082	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Calcium, Total	5350		mg/kg	8.34	2.92	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Chromium, Total	24.8		mg/kg	0.834	0.080	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Cobalt, Total	6.57		mg/kg	1.67	0.138	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Copper, Total	19.3		mg/kg	0.834	0.215	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Iron, Total	22000		mg/kg	4.17	0.753	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Lead, Total	9.64		mg/kg	4.17	0.224	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Magnesium, Total	7940		mg/kg	8.34	1.28	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Manganese, Total	160		mg/kg	0.834	0.133	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Mercury, Total	ND		mg/kg	0.078	0.051	1	04/05/23 18:12	04/05/23 21:49	EPA 7471B	1,7471B	TAA
Nickel, Total	14.7		mg/kg	2.08	0.202	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Potassium, Total	7440		mg/kg	208	12.0	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Selenium, Total	0.520	J	mg/kg	1.67	0.215	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Silver, Total	ND		mg/kg	0.417	0.236	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Sodium, Total	184		mg/kg	167	2.63	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Thallium, Total	ND		mg/kg	1.67	0.263	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Vanadium, Total	38.4		mg/kg	0.834	0.169	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL
Zinc, Total	53.4		mg/kg	4.17	0.244	2	04/05/23 17:34	04/06/23 07:39	EPA 3050B	1,6010D	DHL

General Chemistry - Mansfield Lab

Chromium, Trivalent	24.8		mg/kg	0.883	0.883	1		04/07/23 16:41	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-04

Date Collected: 03/31/23 11:55

Client ID: SB01_9-11

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 61%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	7500		mg/kg	12.5	3.36	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Antimony, Total	ND		mg/kg	6.23	0.474	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Arsenic, Total	6.65		mg/kg	1.25	0.259	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Barium, Total	20.0		mg/kg	1.25	0.217	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Beryllium, Total	0.267	J	mg/kg	0.623	0.041	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Cadmium, Total	0.187	J	mg/kg	1.25	0.122	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Calcium, Total	1520		mg/kg	12.5	4.36	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Chromium, Total	16.7		mg/kg	1.25	0.120	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Cobalt, Total	5.08		mg/kg	2.49	0.207	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Copper, Total	12.0		mg/kg	1.25	0.322	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Iron, Total	11000		mg/kg	6.23	1.12	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Lead, Total	28.5		mg/kg	6.23	0.334	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Magnesium, Total	1940		mg/kg	12.5	1.92	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Manganese, Total	80.6		mg/kg	1.25	0.198	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Mercury, Total	ND		mg/kg	0.105	0.069	1	04/05/23 18:12	04/05/23 22:59	EPA 7471B	1,7471B	TAA
Nickel, Total	18.0		mg/kg	3.12	0.302	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Potassium, Total	1220		mg/kg	312	17.9	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Selenium, Total	0.534	J	mg/kg	2.49	0.322	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Silver, Total	ND		mg/kg	0.623	0.353	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Sodium, Total	401		mg/kg	249	3.92	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Thallium, Total	ND		mg/kg	2.49	0.392	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Vanadium, Total	31.5		mg/kg	1.25	0.253	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
Zinc, Total	55.2		mg/kg	6.23	0.365	2	04/05/23 17:34	04/06/23 13:57	EPA 3050B	1,6010D	DHL
General Chemistry - Mansfield Lab											
Chromium, Trivalent	16.7		mg/kg	1.30	1.30	1		04/07/23 16:41	NA	107,-	



Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-06

Date Collected: 03/31/23 00:00

Client ID: SODUP02_033123

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 65%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	2680		mg/kg	11.6	3.12	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Antimony, Total	ND		mg/kg	5.78	0.439	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Arsenic, Total	4.89		mg/kg	1.16	0.240	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Barium, Total	14.6		mg/kg	1.16	0.201	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Beryllium, Total	0.185	J	mg/kg	0.578	0.038	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Cadmium, Total	0.258	J	mg/kg	1.16	0.113	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Calcium, Total	754		mg/kg	11.6	4.04	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Chromium, Total	8.52		mg/kg	1.16	0.111	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Cobalt, Total	4.10		mg/kg	2.31	0.192	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Copper, Total	21.2		mg/kg	1.16	0.298	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Iron, Total	6690		mg/kg	5.78	1.04	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Lead, Total	42.8		mg/kg	5.78	0.310	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Magnesium, Total	975		mg/kg	11.6	1.78	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Manganese, Total	52.1		mg/kg	1.16	0.184	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Mercury, Total	0.080	J	mg/kg	0.104	0.068	1	04/05/23 18:12	04/05/23 23:02	EPA 7471B	1,7471B	TAA
Nickel, Total	13.3		mg/kg	2.89	0.280	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Potassium, Total	465		mg/kg	289	16.6	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Selenium, Total	0.473	J	mg/kg	2.31	0.298	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Silver, Total	ND		mg/kg	0.578	0.327	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Sodium, Total	165	J	mg/kg	231	3.64	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Thallium, Total	ND		mg/kg	2.31	0.364	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Vanadium, Total	12.4		mg/kg	1.16	0.235	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL
Zinc, Total	47.6		mg/kg	5.78	0.339	2	04/05/23 17:34	04/06/23 14:00	EPA 3050B	1,6010D	DHL

General Chemistry - Mansfield Lab

Chromium, Trivalent	8.52		mg/kg	1.23	1.23	1		04/07/23 16:41	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-08

Date Collected: 03/31/23 16:00

Client ID: SOFB02_033123

Date Received: 03/31/23

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	ND		mg/l	0.0100	0.00327	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Antimony, Total	ND		mg/l	0.00400	0.00042	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Barium, Total	ND		mg/l	0.00050	0.00017	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Calcium, Total	ND		mg/l	0.100	0.0394	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Chromium, Total	ND		mg/l	0.00100	0.00017	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Cobalt, Total	ND		mg/l	0.00050	0.00016	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Copper, Total	ND		mg/l	0.00100	0.00038	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Iron, Total	0.0192	J	mg/l	0.0500	0.0191	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Lead, Total	ND		mg/l	0.00100	0.00034	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Manganese, Total	ND		mg/l	0.00100	0.00044	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Mercury, Total	ND		mg/l	0.00020	0.00009	1	04/03/23 20:32	04/04/23 17:14	EPA 7470A	1,7470A	ZNK
Nickel, Total	ND		mg/l	0.00200	0.00055	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Potassium, Total	ND		mg/l	0.100	0.0309	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Selenium, Total	ND		mg/l	0.00500	0.00173	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Silver, Total	ND		mg/l	0.00040	0.00016	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Sodium, Total	ND		mg/l	0.100	0.0293	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Thallium, Total	ND		mg/l	0.00100	0.00014	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP
Zinc, Total	ND		mg/l	0.01000	0.00341	1	04/03/23 19:06	04/05/23 18:46	EPA 3005A	1,6020B	WKP

General Chemistry - Mansfield Lab

Chromium, Trivalent	ND		mg/l	0.010	0.010	1		04/05/23 18:46	NA	107,-	
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Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 08 Batch: WG1762029-1										
Aluminum, Total	ND		mg/l	0.0100	0.00327	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Antimony, Total	ND		mg/l	0.00400	0.00042	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Barium, Total	ND		mg/l	0.00050	0.00017	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Calcium, Total	ND		mg/l	0.100	0.0394	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Chromium, Total	ND		mg/l	0.00100	0.00017	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Cobalt, Total	ND		mg/l	0.00050	0.00016	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Copper, Total	ND		mg/l	0.00100	0.00038	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Iron, Total	ND		mg/l	0.0500	0.0191	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Lead, Total	ND		mg/l	0.00100	0.00034	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Manganese, Total	ND		mg/l	0.00100	0.00044	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Nickel, Total	ND		mg/l	0.00200	0.00055	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Potassium, Total	ND		mg/l	0.100	0.0309	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Selenium, Total	ND		mg/l	0.00500	0.00173	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Silver, Total	ND		mg/l	0.00040	0.00016	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Sodium, Total	ND		mg/l	0.100	0.0293	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Thallium, Total	0.00033	J	mg/l	0.00100	0.00014	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP
Zinc, Total	0.00753	J	mg/l	0.01000	0.00341	1	04/03/23 19:06	04/05/23 17:58	1,6020B	WKP

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 08 Batch: WG1762030-1										
Mercury, Total	ND		mg/l	0.00020	0.00009	1	04/03/23 20:32	04/04/23 16:58	1,7470A	ZNK



Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-04,06 Batch: WG1762100-1										
Aluminum, Total	ND		mg/kg	4.00	1.08	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Antimony, Total	ND		mg/kg	2.00	0.152	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Arsenic, Total	ND		mg/kg	0.400	0.083	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Barium, Total	ND		mg/kg	0.400	0.070	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Beryllium, Total	ND		mg/kg	0.200	0.013	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Cadmium, Total	ND		mg/kg	0.400	0.039	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Calcium, Total	ND		mg/kg	4.00	1.40	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Chromium, Total	0.119	J	mg/kg	0.400	0.038	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Cobalt, Total	ND		mg/kg	0.800	0.066	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Copper, Total	ND		mg/kg	0.400	0.103	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Iron, Total	0.519	J	mg/kg	2.00	0.361	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Lead, Total	ND		mg/kg	2.00	0.107	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Magnesium, Total	ND		mg/kg	4.00	0.616	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Manganese, Total	ND		mg/kg	0.400	0.064	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Nickel, Total	ND		mg/kg	1.00	0.097	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Potassium, Total	ND		mg/kg	100	5.76	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Selenium, Total	ND		mg/kg	0.800	0.103	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Silver, Total	ND		mg/kg	0.200	0.113	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Sodium, Total	ND		mg/kg	80.0	1.26	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Thallium, Total	ND		mg/kg	0.800	0.126	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Vanadium, Total	ND		mg/kg	0.400	0.081	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL
Zinc, Total	ND		mg/kg	2.00	0.117	1	04/05/23 17:34	04/06/23 07:31	1,6010D	DHL

Prep Information

Digestion Method: EPA 3050B



Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-04,06 Batch: WG1762103-1										
Mercury, Total	ND		mg/kg	0.083	0.054	1	04/05/23 18:12	04/05/23 21:42	1,7471B	TAA

Prep Information

Digestion Method: EPA 7471B

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 08 Batch: WG1762029-2								
Aluminum, Total	106		-		80-120	-		
Antimony, Total	96		-		80-120	-		
Arsenic, Total	101		-		80-120	-		
Barium, Total	101		-		80-120	-		
Beryllium, Total	100		-		80-120	-		
Cadmium, Total	102		-		80-120	-		
Calcium, Total	93		-		80-120	-		
Chromium, Total	103		-		80-120	-		
Cobalt, Total	101		-		80-120	-		
Copper, Total	102		-		80-120	-		
Iron, Total	110		-		80-120	-		
Lead, Total	102		-		80-120	-		
Magnesium, Total	101		-		80-120	-		
Manganese, Total	103		-		80-120	-		
Nickel, Total	101		-		80-120	-		
Potassium, Total	98		-		80-120	-		
Selenium, Total	102		-		80-120	-		
Silver, Total	101		-		80-120	-		
Sodium, Total	100		-		80-120	-		
Thallium, Total	111		-		80-120	-		
Vanadium, Total	102		-		80-120	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 08 Batch: WG1762029-2					
Zinc, Total	98	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 08 Batch: WG1762030-2					
Mercury, Total	97	-	80-120	-	

Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 Batch: WG1762100-2 SRM Lot Number: D116-540					
Aluminum, Total	89	-	45-155	-	
Antimony, Total	203	-	2-205	-	
Arsenic, Total	115	-	82-119	-	
Barium, Total	104	-	82-118	-	
Beryllium, Total	110	-	82-118	-	
Cadmium, Total	108	-	82-118	-	
Calcium, Total	104	-	81-119	-	
Chromium, Total	106	-	81-118	-	
Cobalt, Total	104	-	83-117	-	
Copper, Total	106	-	83-117	-	
Iron, Total	112	-	58-142	-	
Lead, Total	116	-	83-117	-	
Magnesium, Total	97	-	75-125	-	
Manganese, Total	105	-	82-118	-	
Nickel, Total	106	-	82-118	-	
Potassium, Total	96	-	68-131	-	
Selenium, Total	114	-	78-122	-	
Silver, Total	111	-	79-121	-	
Sodium, Total	102	-	71-130	-	
Thallium, Total	113	-	80-120	-	
Vanadium, Total	109	-	78-122	-	

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 Batch: WG1762100-2 SRM Lot Number: D116-540					
Zinc, Total	107	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 Batch: WG1762103-2 SRM Lot Number: D116-540					
Mercury, Total	99	-	58-142	-	

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 08 QC Batch ID: WG1762029-3 QC Sample: L2316092-01 Client ID: MS Sample												
Aluminum, Total	0.024	2	2.08	103		-	-		75-125	-		20
Antimony, Total	0.0009J	0.5	0.4944	99		-	-		75-125	-		20
Arsenic, Total	0.00537	0.12	0.1271	101		-	-		75-125	-		20
Barium, Total	0.0169	2	1.992	99		-	-		75-125	-		20
Beryllium, Total	ND	0.05	0.05135	103		-	-		75-125	-		20
Cadmium, Total	ND	0.053	0.05416	102		-	-		75-125	-		20
Calcium, Total	29.4	10	38.9	95		-	-		75-125	-		20
Chromium, Total	0.0006J	0.2	0.2004	100		-	-		75-125	-		20
Cobalt, Total	0.0003J	0.5	0.4970	99		-	-		75-125	-		20
Copper, Total	0.0013	0.25	0.2527	100		-	-		75-125	-		20
Iron, Total	0.823	1	1.96	114		-	-		75-125	-		20
Lead, Total	0.0008J	0.53	0.5374	101		-	-		75-125	-		20
Magnesium, Total	4.39	10	13.8	94		-	-		75-125	-		20
Manganese, Total	0.2257	0.5	0.7340	102		-	-		75-125	-		20
Nickel, Total	0.0015J	0.5	0.4947	99		-	-		75-125	-		20
Potassium, Total	1.63	10	11.4	98		-	-		75-125	-		20
Selenium, Total	ND	0.12	0.122	102		-	-		75-125	-		20
Silver, Total	ND	0.05	0.05089	102		-	-		75-125	-		20
Sodium, Total	70.6	10	76.9	63	Q	-	-		75-125	-		20
Thallium, Total	ND	0.12	0.1266	106		-	-		75-125	-		20
Vanadium, Total	ND	0.5	0.4939	99		-	-		75-125	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 08 QC Batch ID: WG1762029-3 QC Sample: L2316092-01 Client ID: MS Sample									
Zinc, Total	0.00959J	0.5	0.5023	100	-	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 08 QC Batch ID: WG1762030-3 QC Sample: L2316813-01 Client ID: MS Sample									
Mercury, Total	0.00024	0.005	0.00514	98	-	-	75-125	-	20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery		MSD Found	MSD %Recovery		Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 QC Batch ID: WG1762100-3 WG1762100-4 QC Sample: L2317033-03 Client ID: SB01_0-2											
Aluminum, Total	12200	167	11200	0	Q	11800	0	Q	75-125	5	20
Antimony, Total	ND	41.9	41.6	99		42.4	102		75-125	2	20
Arsenic, Total	2.05	10	12.5	104		13.1	110		75-125	5	20
Barium, Total	126	167	273	88		278	91		75-125	2	20
Beryllium, Total	0.242J	4.19	4.23	101		4.31	103		75-125	2	20
Cadmium, Total	ND	4.44	4.05	91		4.12	93		75-125	2	20
Calcium, Total	5350	837	2010	0	Q	2980	0	Q	75-125	39	Q 20
Chromium, Total	24.8	16.7	37.7	77		38.8	84		75-125	3	20
Cobalt, Total	6.57	41.9	43.4	88		44.3	90		75-125	2	20
Copper, Total	19.3	20.9	38.7	93		39.2	95		75-125	1	20
Iron, Total	22000	83.7	20000	0	Q	21100	0	Q	75-125	5	20
Lead, Total	9.64	44.4	53.0	98		54.7	102		75-125	3	20
Magnesium, Total	7940	837	6190	0	Q	6450	0	Q	75-125	4	20
Manganese, Total	160	41.9	180	48	Q	190	72	Q	75-125	5	20
Nickel, Total	14.7	41.9	49.0	82		50.6	86		75-125	3	20
Potassium, Total	7440	837	7830	46	Q	7940	60	Q	75-125	1	20
Selenium, Total	0.520J	10	11.1	110		11.6	116		75-125	4	20
Silver, Total	ND	4.19	3.82	91		3.94	94		75-125	3	20
Sodium, Total	184	837	958	92		986	96		75-125	3	20
Thallium, Total	ND	10	8.09	80		8.26	82		75-125	2	20
Vanadium, Total	38.4	41.9	73.9	85		76.3	91		75-125	3	20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 QC Batch ID: WG1762100-3 WG1762100-4 QC Sample: L2317033-03 Client ID: SB01_0-2									
Zinc, Total	53.4	41.9	85.6	77	88.9	85	75-125	4	20
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 QC Batch ID: WG1762103-3 WG1762103-4 QC Sample: L2317033-03 Client ID: SB01_0-2									
Mercury, Total	ND	1.39	1.37	98	1.51	96	80-120	10	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 08 QC Batch ID: WG1762029-4 QC Sample: L2316092-01 Client ID: DUP Sample						
Arsenic, Total	0.00537	0.00535	mg/l	0		20
Zinc, Total	0.00959J	0.00945J	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 08 QC Batch ID: WG1762030-4 QC Sample: L2316813-01 Client ID: DUP Sample						
Mercury, Total	0.00024	0.00024	mg/l	2		20

Project Name: 2731 W 12TH ST

Project Number: 170697301

**Lab Serial Dilution
Analysis
Batch Quality Control**

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-04,06 QC Batch ID: WG1762100-6 QC Sample: L2317033-03 Client ID: SB01_0-2						
Aluminum, Total	12200	11700	mg/kg	4		20
Barium, Total	126	122	mg/kg	3		20
Calcium, Total	5350	5280	mg/kg	1		20
Chromium, Total	24.8	22.6	mg/kg	9		20
Iron, Total	22000	22400	mg/kg	2		20
Magnesium, Total	7940	7100	mg/kg	11		20
Manganese, Total	160	156	mg/kg	3		20
Potassium, Total	7440	7020	mg/kg	6		20
Vanadium, Total	38.4	34.6	mg/kg	10		20

INORGANICS & MISCELLANEOUS

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-01

Client ID: SB05_6-8

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 09:50

Date Received: 03/31/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.5		%	0.100	NA	1	-	04/01/23 13:31	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.2	0.24	1	04/06/23 11:40	04/06/23 16:40	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.936	0.187	1	04/06/23 23:00	04/07/23 16:41	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-02

Client ID: SB05_8-10

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 10:00

Date Received: 03/31/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.6		%	0.100	NA	1	-	04/01/23 13:31	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.1	0.24	1	04/06/23 11:40	04/06/23 16:41	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.946	0.189	1	04/06/23 23:00	04/07/23 16:41	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-03

Client ID: SB01_0-2

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 14:20

Date Received: 03/31/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.6		%	0.100	NA	1	-	04/01/23 13:31	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.1	0.23	1	04/06/23 11:40	04/06/23 16:42	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	0.883	0.177	1	04/06/23 23:00	04/07/23 16:41	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-04

Client ID: SB01_9-11

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 11:55

Date Received: 03/31/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	61.3		%	0.100	NA	1	-	04/01/23 13:31	121,2540G	ROI
Cyanide, Total	ND		mg/kg	1.5	0.32	1	04/06/23 11:40	04/06/23 16:21	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	1.30	0.261	1	04/06/23 23:00	04/07/23 16:41	1,7196A	LOF



Project Name: 2731 W 12TH ST**Project Number:** 170697301**Lab Number:** L2317033**Report Date:** 04/10/23**SAMPLE RESULTS****Lab ID:** L2317033-05**Client ID:** SB13_12-14**Sample Location:** 2731 W 12TH ST, BROOKLYN, NY**Date Collected:** 03/31/23 15:35**Date Received:** 03/31/23**Field Prep:** Not Specified**Sample Depth:****Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.5		%	0.100	NA	1	-	04/01/23 13:31	121,2540G	ROI



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-06

Client ID: SODUP02_033123

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 00:00

Date Received: 03/31/23

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	65.1		%	0.100	NA	1	-	04/01/23 13:31	121,2540G	ROI
Cyanide, Total	0.44	J	mg/kg	1.5	0.32	1	04/06/23 11:40	04/06/23 16:22	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/kg	1.23	0.246	1	04/06/23 23:00	04/07/23 16:41	1,7196A	LOF



Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

SAMPLE RESULTS

Lab ID: L2317033-08

Client ID: SOFB02_033123

Sample Location: 2731 W 12TH ST, BROOKLYN, NY

Date Collected: 03/31/23 16:00

Date Received: 03/31/23

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Total	0.002	J	mg/l	0.005	0.001	1	04/07/23 05:10	04/07/23 12:07	1,9010C/9012B	JER
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	04/01/23 08:00	04/01/23 08:28	1,7196A	DWH



Project Name: 2731 W 12TH ST

Lab Number: L2317033

Project Number: 170697301

Report Date: 04/10/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 08 Batch: WG1761540-1										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	04/01/23 08:00	04/01/23 08:27	1,7196A	DWH
General Chemistry - Westborough Lab for sample(s): 08 Batch: WG1763265-1										
Cyanide, Total	ND		mg/l	0.005	0.001	1	04/07/23 05:10	04/07/23 11:54	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 04,06 Batch: WG1763456-1										
Cyanide, Total	ND		mg/kg	0.99	0.21	1	04/06/23 11:40	04/06/23 16:17	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1763459-1										
Cyanide, Total	ND		mg/kg	0.99	0.21	1	04/06/23 11:40	04/06/23 16:17	1,9010C/9012B	JER
General Chemistry - Westborough Lab for sample(s): 01-04,06 Batch: WG1763750-1										
Chromium, Hexavalent	ND		mg/kg	0.800	0.160	1	04/06/23 23:00	04/07/23 16:41	1,7196A	LOF



Lab Control Sample Analysis Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 08 Batch: WG1761540-2								
Chromium, Hexavalent	97		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 08 Batch: WG1763265-2 WG1763265-3								
Cyanide, Total	106		112		85-115	6		20
General Chemistry - Westborough Lab Associated sample(s): 04,06 Batch: WG1763456-2 WG1763456-3								
Cyanide, Total	79	Q	92		80-120	15		35
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1763459-2 WG1763459-3								
Cyanide, Total	79	Q	92		80-120	15		35
General Chemistry - Westborough Lab Associated sample(s): 01-04,06 Batch: WG1763750-2								
Chromium, Hexavalent	81		-		80-120	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: 2731 W 12TH ST

Project Number: 170697301

Lab Number: L2317033

Report Date: 04/10/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 08 QC Batch ID: WG1761540-4 QC Sample: L2317033-08 Client ID: SOFB02_033123												
Chromium, Hexavalent	ND	0.1	0.100	100		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 08 QC Batch ID: WG1763265-4 WG1763265-5 QC Sample: L2316865-03 Client ID: MS Sample												
Cyanide, Total	0.002J	0.2	0.219	110		0.222	111		80-120	1		20
General Chemistry - Westborough Lab Associated sample(s): 04,06 QC Batch ID: WG1763456-4 WG1763456-5 QC Sample: L2317866-01 Client ID: MS Sample												
Cyanide, Total	ND	10	11	110		9.9	100		75-125	10		35
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1763459-4 WG1763459-5 QC Sample: L2317033-03 Client ID: SB01_0-2												
Cyanide, Total	ND	11	11	100		11	110		75-125	10		35
General Chemistry - Westborough Lab Associated sample(s): 01-04,06 QC Batch ID: WG1763750-4 WG1763750-5 QC Sample: L2317033-03 Client ID: SB01_0-2												
Chromium, Hexavalent	ND	1220	1110	91		1000	89		75-125	10		20

Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L2317033
Report Date: 04/10/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 08 QC Batch ID: WG1761540-3 QC Sample: L2317033-08 Client ID: SOFB02_033123						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1761548-1 QC Sample: L2317033-03 Client ID: SB01_0-2						
Solids, Total	90.6	90.9	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 01-04,06 QC Batch ID: WG1763750-7 QC Sample: L2317033-03 Client ID: SB01_0-2						
Chromium, Hexavalent	ND	ND	mg/kg	NC		20

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2317033-01A	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)
L2317033-01B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-01C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-01D	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),TL-TI(180),AL-TI(180),NI-TI(180),ZN-TI(180),CU-TI(180),SB-TI(180),PB-TI(180),SE-TI(180),CO-TI(180),V-TI(180),MG-TI(180),MN-TI(180),HG-T(28),FE-TI(180),CD-TI(180),CA-TI(180),K-TI(180),NA-TI(180)
L2317033-01F	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2317033-01G	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		NYTCL-8270(14),TCN-9010(14),HEXCR-7196(30)
L2317033-02A	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)
L2317033-02B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-02C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-02D	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-02E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-TI(180),BA-TI(180),AS-TI(180),AG-TI(180),CR-TI(180),TL-TI(180),AL-TI(180),NI-TI(180),PB-TI(180),ZN-TI(180),CU-TI(180),SB-TI(180),SE-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MN-TI(180),MG-TI(180),NA-TI(180),CA-TI(180),CD-TI(180),K-TI(180)
L2317033-02F	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2317033-02G	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),HEXCR-7196(30)
L2317033-03A	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)
L2317033-03A1	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)

*Values in parentheses indicate holding time in days

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2317033-03A2	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)
L2317033-03B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-03B1	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-03B2	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-03C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-03C1	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-03C2	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-03D	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-03D1	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-03D2	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-03E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-Ti(180),AS-Ti(180),BA-Ti(180),AG-Ti(180),NI-Ti(180),AL-Ti(180),TL-Ti(180),CR-Ti(180),CU-Ti(180),PB-Ti(180),SB-Ti(180),SE-Ti(180),ZN-Ti(180),V-Ti(180),CO-Ti(180),MN-Ti(180),MG-Ti(180),HG-T(28),FE-Ti(180),CA-Ti(180),CD-Ti(180),K-Ti(180),NA-Ti(180)
L2317033-03E1	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-Ti(180),AS-Ti(180),BA-Ti(180),AG-Ti(180),NI-Ti(180),AL-Ti(180),TL-Ti(180),CR-Ti(180),CU-Ti(180),PB-Ti(180),SB-Ti(180),SE-Ti(180),ZN-Ti(180),V-Ti(180),CO-Ti(180),MN-Ti(180),MG-Ti(180),HG-T(28),FE-Ti(180),CA-Ti(180),CD-Ti(180),K-Ti(180),NA-Ti(180)
L2317033-03E2	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-Ti(180),AS-Ti(180),BA-Ti(180),AG-Ti(180),NI-Ti(180),AL-Ti(180),TL-Ti(180),CR-Ti(180),CU-Ti(180),PB-Ti(180),SB-Ti(180),SE-Ti(180),ZN-Ti(180),V-Ti(180),CO-Ti(180),MN-Ti(180),MG-Ti(180),HG-T(28),FE-Ti(180),CA-Ti(180),CD-Ti(180),K-Ti(180),NA-Ti(180)
L2317033-03F	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-03F1	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-03F2	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-03G	Glass 500ml/16oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-03G1	Glass 500ml/16oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-03G2	Glass 500ml/16oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)

Project Name: 2731 W 12TH ST
Project Number: 170697301

Serial_No:04102310:32
Lab Number: L2317033
Report Date: 04/10/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2317033-04A	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)
L2317033-04B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-04C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-04D	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-Ti(180),BA-Ti(180),AS-Ti(180),AG-Ti(180),AL-Ti(180),CR-Ti(180),TL-Ti(180),NI-Ti(180),PB-Ti(180),SE-Ti(180),CU-Ti(180),SB-Ti(180),ZN-Ti(180),V-Ti(180),CO-Ti(180),HG-T(28),MG-Ti(180),FE-Ti(180),MN-Ti(180),CA-Ti(180),K-Ti(180),NA-Ti(180),CD-Ti(180)
L2317033-04F	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-04G	Glass 500ml/16oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-05A	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260H(14),NYTCL-8260HLW(14)
L2317033-05B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260H(14),NYTCL-8260HLW(14)
L2317033-05C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260H(14),NYTCL-8260HLW(14)
L2317033-05D	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-05E	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		NYTCL-8270(14)
L2317033-06A	Vial MeOH preserved	A	NA		3.6	Y	Absent		NYTCL-8260HLW(14)
L2317033-06B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-06C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	NYTCL-8260HLW(14)
L2317033-06D	Plastic 120ml unpreserved	A	NA		3.6	Y	Absent		TS(7)
L2317033-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.6	Y	Absent		BE-Ti(180),AS-Ti(180),BA-Ti(180),AG-Ti(180),NI-Ti(180),CR-Ti(180),AL-Ti(180),TL-Ti(180),SB-Ti(180),SE-Ti(180),ZN-Ti(180),PB-Ti(180),CU-Ti(180),CO-Ti(180),V-Ti(180),MG-Ti(180),MN-Ti(180),HG-T(28),FE-Ti(180),CA-Ti(180),CD-Ti(180),K-Ti(180),NA-Ti(180)
L2317033-06F	Glass 120ml/4oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-06G	Glass 500ml/16oz unpreserved	A	NA		3.6	Y	Absent		TCN-9010(14),NYTCL-8270(14),NYTCL-8082(365),HEXCR-7196(30)
L2317033-07A	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)
L2317033-07B	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)
L2317033-08A	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)

Project Name: 2731 W 12TH ST**Lab Number:** L2317033**Project Number:** 170697301**Report Date:** 04/10/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2317033-08B	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)
L2317033-08C	Vial HCl preserved	B	NA		3.4	Y	Absent		NYTCL-8260(14)
L2317033-08D	Amber 120ml unpreserved	B	7	7	3.4	Y	Absent		NYTCL-8082-LVI(365)
L2317033-08E	Amber 120ml unpreserved	B	7	7	3.4	Y	Absent		NYTCL-8082-LVI(365)
L2317033-08F	Amber 120ml unpreserved	B	7	7	3.4	Y	Absent		NYTCL-8081(7)
L2317033-08G	Amber 120ml unpreserved	B	7	7	3.4	Y	Absent		NYTCL-8081(7)
L2317033-08H	Plastic 250ml HNO3 preserved	B	<2	<2	3.4	Y	Absent		BA-6020T(180),SE-6020T(180),TL-6020T(180),FE-6020T(180),NI-6020T(180),CA-6020T(180),CR-6020T(180),K-6020T(180),NA-6020T(180),CU-6020T(180),ZN-6020T(180),PB-6020T(180),BE-6020T(180),MN-6020T(180),V-6020T(180),SB-6020T(180),AS-6020T(180),MG-6020T(180),HG-T(28),AG-6020T(180),AL-6020T(180),CD-6020T(180),CO-6020T(180)
L2317033-08I	Plastic 250ml NaOH preserved	B	>12	>12	3.4	Y	Absent		TCN-9010(14)
L2317033-08J	Amber 250ml unpreserved	B	7	7	3.4	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L2317033-08K	Amber 250ml unpreserved	B	7	7	3.4	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L2317033-08L	Plastic 500ml unpreserved	B	7	7	3.4	Y	Absent		HEXCR-7196(1)
L2317033-08M	Amber 1000ml unpreserved	B	7	7	3.4	Y	Absent		HERB-APA(7)
L2317033-08N	Amber 1000ml unpreserved	B	7	7	3.4	Y	Absent		HERB-APA(7)
L2317033-09A	Vial MeOH preserved	A	NA		3.6	Y	Absent		ARCHIVE()
L2317033-09B	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	ARCHIVE()
L2317033-09C	Vial water preserved	A	NA		3.6	Y	Absent	01-APR-23 04:21	ARCHIVE()

Container Comments

L2317033-09B	Received empty
L2317033-09C	Received empty

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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

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Project Name: 2731 W 12TH ST
Project Number: 170697301

Lab Number: L2317033
Report Date: 04/10/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 107 Alpha Analytical - In-house calculation method.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.

ID No.:17873

Facility: **Company-wide**

Revision 19

Department: **Quality Assurance**

Published Date: 4/2/2021 1:14:23 PM

Title: **Certificate/Approval Program Summary**

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Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B


The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:**Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

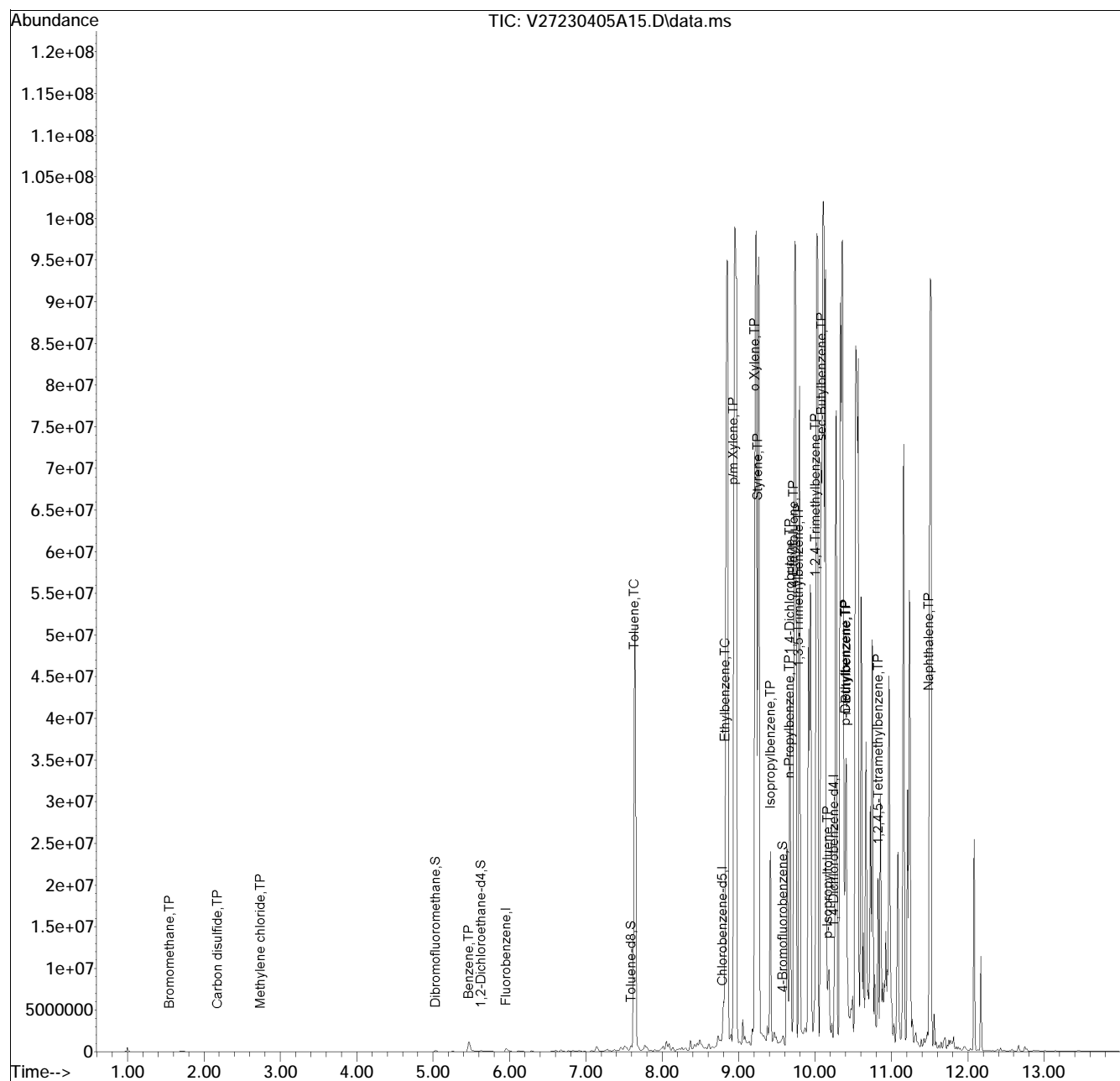
 NEW YORK CHAIN OF CUSTODY		Service Centers Mahwah, NJ 07430: 35 Whitney Rd, Suite 5 Albany, NY 12205: 14 Walker Way Tonawanda, NY 14150: 275 Cooper Ave, Suite 105		Page of		Date Rec'd in Lab 4/1/23		ALPHA Job # 12317033	
Westborough, MA 01581 8 Walkup Dr. TEL: 508-898-9220 FAX: 508-898-9193		Mansfield, MA 02048 320 Forbes Blvd TEL: 508-822-9300 FAX: 508-822-3288		Project Information Project Name: 2731 W 12th St Project Location: 2731 W 12th St, Brooklyn NY Project # 17033 (Use Project name as Project #) <input type="checkbox"/>		Deliverables <input type="checkbox"/> ASP-A <input checked="" type="checkbox"/> ASP-B <input type="checkbox"/> EQuIS (1 File) <input type="checkbox"/> EQuIS (4 File) <input type="checkbox"/> Other		Billing Information <input checked="" type="checkbox"/> Same as Client Info PO #	
Client Information Client: Langan Address: 360 W 31st St NY, NY, 10001 Phone: 212-479-5400 Fax: Email: edadkins@langan.com		Project Manager: Elizabeth Adkins ALPHAQuote #: Turn-Around Time Standard <input checked="" type="checkbox"/> Due Date: Rush (only if pre approved) <input type="checkbox"/> # of Days:		Regulatory Requirement <input type="checkbox"/> NY TOGS <input checked="" type="checkbox"/> NY Part 375 <input type="checkbox"/> AWQ Standards <input type="checkbox"/> NY CP-51 <input type="checkbox"/> NY Restricted Use <input type="checkbox"/> Other <input type="checkbox"/> NY Unrestricted Use <input type="checkbox"/> NYC Sewer Discharge		Disposal Site Information Please identify below location of applicable disposal facilities. Disposal Facility: <input type="checkbox"/> NJ <input type="checkbox"/> NY <input type="checkbox"/> Other:			
These samples have been previously analyzed by Alpha <input type="checkbox"/>				ANALYSIS				Sample Filtration <input type="checkbox"/> Done <input type="checkbox"/> Lab to do <input type="checkbox"/> Lab to do (Please Specify below)	
Other project specific requirements/comments: cc: data.management@langan.com & lgrass@langan.com				Please specify Metals or TAL.				Sample Specific Comments	
ALPHA Lab ID (Lab Use Only)		Sample ID		Collection Date Time		Sample Matrix		Sampler's Initials	
17033-01		SB05-6-8		03/23 0950		S		CA	
02		SB05-8-10		1000		S		CA	
03		SB01-0-2		1420		S		CA	
04		SB01-9-11		1155		S		CA	
05		SB13-12-14		1535		S		CA	
06		SODUP02-033123		1600		S		CA	
07		TB02-033123		1600		S		CA	
08		S0FB02-033123		1600		S		CA	
Preservative Code: A = None B = HCl C = HNO ₃ D = H ₂ SO ₄ E = NaOH F = MeOH G = NaHSO ₄ H = Na ₂ S ₂ O ₃ K/E = Zn Ac/NaOH O = Other		Container Code P = Plastic A = Amber Glass V = Vial G = Glass B = Bacteria Cup C = Cube O = Other E = Encore D = BOD Bottle		Westboro: Certification No: MA935 Mansfield: Certification No: MA015		Container Type		Preservative	
Relinquished By: Camille Rupp (Langan) MSMR (PRA) 100		Date/Time 3/31/23 1639 3/31/23 2005 4/1/23 0010 4/1/23 0210		Received By: NGM (PRA) 100 100 100		Date/Time 3/31/23 1639 3/31/23 2100 4/1/23 0010 4/1/23 0210		Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)	

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2023\230405A\
 Data File : V27230405A15.D
 Acq On : 05 Apr 2023 12:23 pm
 Operator : VOA127:AJK
 Sample : L2317033-01,31H,5.25,5,0.100,,A
 Misc : WG1763068,ICAL19866
 ALS Vial : 15 Sample Multiplier: 1

Quant Time: Apr 06 15:54:04 2023
 Quant Method : I:\VOLATILES\VOA127\2023\230405A\V127_230328A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Wed Mar 29 09:51:44 2023
 Response via : Initial Calibration

Sub List : 8260-NYTCL - Megamix plus Diox30405A\V27230405A01.D•

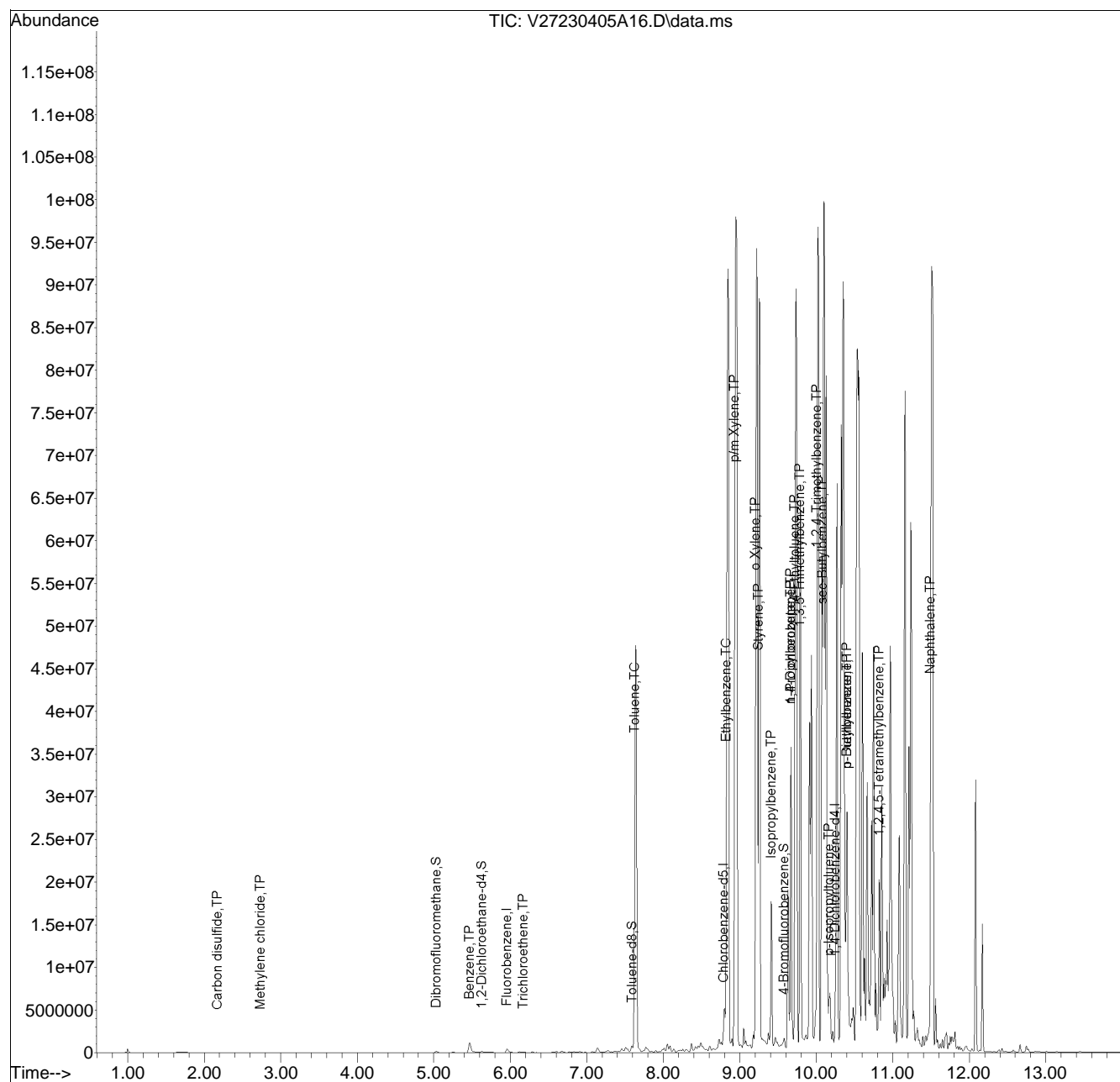


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2023\230405A\
 Data File : V27230405A16.D
 Acq On : 05 Apr 2023 12:43 pm
 Operator : VOA127:AJK
 Sample : L2317033-02,31H,5.29,5,0.100,,A
 Misc : WG1763068,ICAL19866
 ALS Vial : 16 Sample Multiplier: 1

Quant Time: Apr 05 13:06:33 2023
 Quant Method : I:\VOLATILES\VOA127\2023\230405A\V127_230328A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Wed Mar 29 09:51:44 2023
 Response via : Initial Calibration

Sub List : 8260-NYTCL - Megamix plus Diox30405A\V27230405A01.D•



APPENDIX F

LABORATORY ANALYTICAL REPORTS – SOIL VAPOR



ANALYTICAL REPORT

Lab Number:	L2316799
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Elizabeth Adkins
Phone:	(212) 479-5400
Project Name:	2731 12TH ST
Project Number:	170697301
Report Date:	04/06/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2316799-01	SV01_033023	SOIL_VAPOR	2731 12TH ST, BROOKLYN NY	03/30/23 14:10	03/30/23
L2316799-02	SV02_033023	SOIL_VAPOR	2731 12TH ST, BROOKLYN NY	03/30/23 15:11	03/30/23
L2316799-03	SV03_033023	SOIL_VAPOR	2731 12TH ST, BROOKLYN NY	03/30/23 16:36	03/30/23
L2316799-04	SV04_033023	SOIL_VAPOR	2731 12TH ST, BROOKLYN NY	03/30/23 13:32	03/30/23
L2316799-05	AA01_033023	AIR	2731 12TH ST, BROOKLYN NY	03/30/23 14:32	03/30/23

Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

Case Narrative (continued)

Volatile Organics in Air

Canisters were released from the laboratory on March 30, 2023. The canister certification results are provided as an addendum.

L2316799-01D: The sample was re-analyzed on dilution in order to quantitate the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-analysis was performed only for the compound(s) that exceeded the calibration range.

L2316799-02D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

The WG1763188-3 LCS recoveries for carbon tetrachloride (135%), dibromochloromethane (136%) and bromoform (146%) are above the upper 130% acceptance limit. All samples associated with this LCS do not have reportable amounts of these analytes.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Christopher J. Anderson

Title: Technical Director/Representative

Date: 04/06/23

AIR

Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-01
 Client ID: SV01_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 14:10
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15
 Analytical Date: 04/05/23 20:10
 Analyst: RAY

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.571	0.200	--	2.82	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	8.92	5.00	--	16.8	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	78.6	1.00	--	187	2.38	--		1
Trichlorofluoromethane	0.284	0.200	--	1.60	1.12	--		1
Isopropanol	1.19	0.500	--	2.93	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	20.7	0.200	--	64.5	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	129	0.500	--	380	1.47	--	E	1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-01

Client ID: SV01_033023

Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 14:10

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	0.238	0.200	--	1.16	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	1.05	0.200	--	3.70	0.705	--		1
1,1,1-Trichloroethane	0.626	0.200	--	3.42	1.09	--		1
Benzene	21.8	0.200	--	69.6	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	0.605	0.200	--	2.08	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
Xylenes, Total	18.5	0.200	--	80.4	0.869	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	0.538	0.200	--	2.51	0.934	--		1
Heptane	1.71	0.200	--	7.01	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	0.569	0.500	--	2.33	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	13.2	0.200	--	49.7	0.754	--		1
2-Hexanone	6.94	0.200	--	28.4	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	0.256	0.200	--	1.74	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-01

Date Collected: 03/30/23 14:10

Client ID: SV01_033023

Date Received: 03/30/23

Sample Location: 2731 12TH ST, BROOKLYN NY

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethylbenzene	19.9	0.200	--	86.4	0.869	--		1
p/m-Xylene	10.6	0.400	--	46.0	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	2.52	0.200	--	10.7	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	7.87	0.200	--	34.2	0.869	--		1
4-Ethyltoluene	2.94	0.200	--	14.5	0.983	--		1
1,3,5-Trimethylbenzene	1.57	0.200	--	7.72	0.983	--		1
1,2,4-Trimethylbenzene	4.60	0.200	--	22.6	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	97		60-140
Bromochloromethane	99		60-140
chlorobenzene-d5	98		60-140



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-01 D
 Client ID: SV01_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 14:10
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil_Vapor

Analytical Method: 48,TO-15

Analytical Date: 04/06/23 06:17

Analyst: RAY

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
2-Butanone	120	3.12	--	354	9.20	--		6.25

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	93		60-140
Bromochloromethane	91		60-140
chlorobenzene-d5	92		60-140



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-02 D
 Client ID: SV02_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 15:11
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15
 Analytical Date: 04/06/23 07:27
 Analyst: RAY

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	ND	1.00	--	ND	4.94	--		5
Chloromethane	ND	1.00	--	ND	2.07	--		5
Freon-114	ND	1.00	--	ND	6.99	--		5
Vinyl chloride	ND	1.00	--	ND	2.56	--		5
1,3-Butadiene	1.22	1.00	--	2.70	2.21	--		5
Bromomethane	ND	1.00	--	ND	3.88	--		5
Chloroethane	ND	1.00	--	ND	2.64	--		5
Ethanol	ND	25.0	--	ND	47.1	--		5
Vinyl bromide	ND	1.00	--	ND	4.37	--		5
Acetone	132	5.00	--	314	11.9	--		5
Trichlorofluoromethane	ND	1.00	--	ND	5.62	--		5
Isopropanol	ND	2.50	--	ND	6.15	--		5
1,1-Dichloroethene	ND	1.00	--	ND	3.96	--		5
Tertiary butyl Alcohol	ND	2.50	--	ND	7.58	--		5
Methylene chloride	ND	2.50	--	ND	8.69	--		5
3-Chloropropene	ND	1.00	--	ND	3.13	--		5
Carbon disulfide	21.4	1.00	--	66.6	3.11	--		5
Freon-113	ND	1.00	--	ND	7.66	--		5
trans-1,2-Dichloroethene	ND	1.00	--	ND	3.96	--		5
1,1-Dichloroethane	ND	1.00	--	ND	4.05	--		5
Methyl tert butyl ether	ND	1.00	--	ND	3.61	--		5
2-Butanone	3.91	2.50	--	11.5	7.37	--		5
cis-1,2-Dichloroethene	ND	1.00	--	ND	3.96	--		5



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-02 D
 Client ID: SV02_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 15:11
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethyl Acetate	ND	2.50	--	ND	9.01	--		5
Chloroform	ND	1.00	--	ND	4.88	--		5
Tetrahydrofuran	ND	2.50	--	ND	7.37	--		5
1,2-Dichloroethane	ND	1.00	--	ND	4.05	--		5
n-Hexane	134	1.00	--	472	3.52	--		5
1,1,1-Trichloroethane	ND	1.00	--	ND	5.46	--		5
Benzene	12.5	1.00	--	39.9	3.19	--		5
Carbon tetrachloride	ND	1.00	--	ND	6.29	--		5
Cyclohexane	234	1.00	--	805	3.44	--		5
1,2-Dichloropropane	ND	1.00	--	ND	4.62	--		5
Xylenes, Total	10.9	1.00	--	47.3	4.34	--		5
Bromodichloromethane	ND	1.00	--	ND	6.70	--		5
1,4-Dioxane	ND	1.00	--	ND	3.60	--		5
Trichloroethene	ND	1.00	--	ND	5.37	--		5
2,2,4-Trimethylpentane	57.5	1.00	--	269	4.67	--		5
Heptane	33.6	1.00	--	138	4.10	--		5
cis-1,3-Dichloropropene	ND	1.00	--	ND	4.54	--		5
4-Methyl-2-pentanone	ND	2.50	--	ND	10.2	--		5
trans-1,3-Dichloropropene	ND	1.00	--	ND	4.54	--		5
1,1,2-Trichloroethane	ND	1.00	--	ND	5.46	--		5
Toluene	4.86	1.00	--	18.3	3.77	--		5
2-Hexanone	ND	1.00	--	ND	4.10	--		5
Dibromochloromethane	ND	1.00	--	ND	8.52	--		5
1,2-Dibromoethane	ND	1.00	--	ND	7.69	--		5
Tetrachloroethene	ND	1.00	--	ND	6.78	--		5
Chlorobenzene	ND	1.00	--	ND	4.61	--		5



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-02 D
 Client ID: SV02_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 15:11
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethylbenzene	10.2	1.00	--	44.3	4.34	--		5
p/m-Xylene	6.78	2.00	--	29.4	8.69	--		5
Bromoform	ND	1.00	--	ND	10.3	--		5
Styrene	1.44	1.00	--	6.13	4.26	--		5
1,1,2,2-Tetrachloroethane	ND	1.00	--	ND	6.87	--		5
o-Xylene	4.11	1.00	--	17.9	4.34	--		5
4-Ethyltoluene	7.14	1.00	--	35.1	4.92	--		5
1,3,5-Trimethylbenzene	ND	1.00	--	ND	4.92	--		5
1,2,4-Trimethylbenzene	2.64	1.00	--	13.0	4.92	--		5
Benzyl chloride	ND	1.00	--	ND	5.18	--		5
1,3-Dichlorobenzene	ND	1.00	--	ND	6.01	--		5
1,4-Dichlorobenzene	ND	1.00	--	ND	6.01	--		5
1,2-Dichlorobenzene	ND	1.00	--	ND	6.01	--		5
1,2,4-Trichlorobenzene	ND	1.00	--	ND	7.42	--		5
Hexachlorobutadiene	ND	1.00	--	ND	10.7	--		5

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	91		60-140
Bromochloromethane	89		60-140
chlorobenzene-d5	110		60-140



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-03
 Client ID: SV03_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 16:36
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15
 Analytical Date: 04/05/23 21:25
 Analyst: RAY

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.703	0.200	--	3.48	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	10.7	5.00	--	20.2	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	22.1	1.00	--	52.5	2.38	--		1
Trichlorofluoromethane	0.455	0.200	--	2.56	1.12	--		1
Isopropanol	2.76	0.500	--	6.78	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	0.506	0.500	--	1.53	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	1.95	0.200	--	6.07	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	2.07	0.500	--	6.11	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-03
 Client ID: SV03_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 16:36
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	0.989	0.200	--	3.16	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
Xylenes, Total	2.06	0.200	--	8.95	0.869	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	0.355	0.200	--	1.34	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-03

Date Collected: 03/30/23 16:36

Client ID: SV03_033023

Date Received: 03/30/23

Sample Location: 2731 12TH ST, BROOKLYN NY

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethylbenzene	1.53	0.200	--	6.65	0.869	--		1
p/m-Xylene	1.17	0.400	--	5.08	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	0.891	0.200	--	3.87	0.869	--		1
4-Ethyltoluene	0.394	0.200	--	1.94	0.983	--		1
1,3,5-Trimethylbenzene	0.420	0.200	--	2.06	0.983	--		1
1,2,4-Trimethylbenzene	1.75	0.200	--	8.60	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	88		60-140
Bromochloromethane	85		60-140
chlorobenzene-d5	88		60-140



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-04
 Client ID: SV04_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 13:32
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil_Vapor
 Analytical Method: 48,TO-15
 Analytical Date: 04/05/23 22:03
 Analyst: RAY

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.567	0.200	--	2.80	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	0.395	0.200	--	0.874	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	52.8	1.00	--	125	2.38	--		1
Trichlorofluoromethane	0.300	0.200	--	1.69	1.12	--		1
Isopropanol	1.37	0.500	--	3.37	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	51.1	0.200	--	159	0.623	--		1
Freon-113	0.222	0.200	--	1.70	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	5.71	0.500	--	16.8	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-04
 Client ID: SV04_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 13:32
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	5.79	0.200	--	20.4	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	40.7	0.200	--	130	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	4.69	0.200	--	16.1	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
Xylenes, Total	30.2	0.200	--	131	0.869	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	3.43	0.200	--	16.0	0.934	--		1
Heptane	4.38	0.200	--	17.9	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	17.2	0.200	--	64.8	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	0.374	0.200	--	2.54	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-04

Date Collected: 03/30/23 13:32

Client ID: SV04_033023

Date Received: 03/30/23

Sample Location: 2731 12TH ST, BROOKLYN NY

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethylbenzene	29.8	0.200	--	129	0.869	--		1
p/m-Xylene	17.9	0.400	--	77.7	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	7.28	0.200	--	31.0	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	12.3	0.200	--	53.4	0.869	--		1
4-Ethyltoluene	5.46	0.200	--	26.8	0.983	--		1
1,3,5-Trimethylbenzene	6.09	0.200	--	29.9	0.983	--		1
1,2,4-Trimethylbenzene	10.5	0.200	--	51.6	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	90		60-140
Bromochloromethane	87		60-140
chlorobenzene-d5	92		60-140



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-05
 Client ID: AA01_033023
 Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 14:32
 Date Received: 03/30/23
 Field Prep: Not Specified

Sample Depth:
 Matrix: Air
 Analytical Method: 48,TO-15
 Analytical Date: 04/05/23 17:43
 Analyst: RAY

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.490	0.200	--	2.42	0.989	--		1
Chloromethane	0.500	0.200	--	1.03	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	1.20	1.00	--	2.85	2.38	--		1
Trichlorofluoromethane	0.238	0.200	--	1.34	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1



Project Name: 2731 12TH ST**Project Number:** 170697301**Lab Number:** L2316799**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-05

Client ID: AA01_033023

Sample Location: 2731 12TH ST, BROOKLYN NY

Date Collected: 03/30/23 14:32

Date Received: 03/30/23

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Xylenes, Total	ND	0.200	--	ND	0.869	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**SAMPLE RESULTS**

Lab ID: L2316799-05

Date Collected: 03/30/23 14:32

Client ID: AA01_033023

Date Received: 03/30/23

Sample Location: 2731 12TH ST, BROOKLYN NY

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	95		60-140
Bromochloromethane	98		60-140
chlorobenzene-d5	94		60-140



Project Name: 2731 12TH ST

Lab Number: L2316799

Project Number: 170697301

Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 04/05/23 15:26

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01-05 Batch: WG1763188-4								
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Xylenes, Total	ND	0.200	--	ND	0.869	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1



Project Name: 2731 12TH ST

Lab Number: L2316799

Project Number: 170697301

Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 04/05/23 15:26

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01-05 Batch: WG1763188-4								
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1



Project Name: 2731 12TH ST

Lab Number: L2316799

Project Number: 170697301

Report Date: 04/06/23

Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 04/05/23 15:26

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01-05 Batch: WG1763188-4								
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1



Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 12TH ST

Project Number: 170697301

Lab Number: L2316799

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG1763188-3								
Dichlorodifluoromethane	107		-		70-130	-		
Chloromethane	88		-		70-130	-		
Freon-114	94		-		70-130	-		
Vinyl chloride	93		-		70-130	-		
1,3-Butadiene	86		-		70-130	-		
Bromomethane	97		-		70-130	-		
Chloroethane	90		-		70-130	-		
Ethanol	85		-		40-160	-		
Vinyl bromide	104		-		70-130	-		
Acetone	103		-		40-160	-		
Trichlorofluoromethane	115		-		70-130	-		
Isopropanol	91		-		40-160	-		
1,1-Dichloroethene	110		-		70-130	-		
Tertiary butyl Alcohol	98		-		70-130	-		
Methylene chloride	99		-		70-130	-		
3-Chloropropene	105		-		70-130	-		
Carbon disulfide	100		-		70-130	-		
Freon-113	110		-		70-130	-		
trans-1,2-Dichloroethene	106		-		70-130	-		
1,1-Dichloroethane	106		-		70-130	-		
Methyl tert butyl ether	95		-		70-130	-		
2-Butanone	101		-		70-130	-		
cis-1,2-Dichloroethene	109		-		70-130	-		

Lab Control Sample Analysis **Batch Quality Control**

Project Name: 2731 12TH ST

Project Number: 170697301

Lab Number: L2316799

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG1763188-3								
Ethyl Acetate	111		-		70-130	-		
Chloroform	112		-		70-130	-		
Tetrahydrofuran	96		-		70-130	-		
1,2-Dichloroethane	114		-		70-130	-		
n-Hexane	107		-		70-130	-		
1,1,1-Trichloroethane	126		-		70-130	-		
Benzene	95		-		70-130	-		
Carbon tetrachloride	135	Q	-		70-130	-		
Cyclohexane	107		-		70-130	-		
1,2-Dichloropropane	108		-		70-130	-		
Bromodichloromethane	127		-		70-130	-		
1,4-Dioxane	107		-		70-130	-		
Trichloroethene	112		-		70-130	-		
2,2,4-Trimethylpentane	110		-		70-130	-		
Heptane	105		-		70-130	-		
cis-1,3-Dichloropropene	108		-		70-130	-		
4-Methyl-2-pentanone	109		-		70-130	-		
trans-1,3-Dichloropropene	93		-		70-130	-		
1,1,2-Trichloroethane	117		-		70-130	-		
Toluene	98		-		70-130	-		
2-Hexanone	96		-		70-130	-		
Dibromochloromethane	136	Q	-		70-130	-		
1,2-Dibromoethane	101		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 2731 12TH ST

Project Number: 170697301

Lab Number: L2316799

Report Date: 04/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-05 Batch: WG1763188-3								
Tetrachloroethene	105		-		70-130	-		
Chlorobenzene	96		-		70-130	-		
Ethylbenzene	106		-		70-130	-		
p/m-Xylene	106		-		70-130	-		
Bromoform	146	Q	-		70-130	-		
Styrene	96		-		70-130	-		
1,1,2,2-Tetrachloroethane	105		-		70-130	-		
o-Xylene	108		-		70-130	-		
4-Ethyltoluene	100		-		70-130	-		
1,3,5-Trimethylbenzene	98		-		70-130	-		
1,2,4-Trimethylbenzene	101		-		70-130	-		
Benzyl chloride	108		-		70-130	-		
1,3-Dichlorobenzene	101		-		70-130	-		
1,4-Dichlorobenzene	99		-		70-130	-		
1,2-Dichlorobenzene	102		-		70-130	-		
1,2,4-Trichlorobenzene	93		-		70-130	-		
Hexachlorobutadiene	101		-		70-130	-		

Project Name: 2731 12TH ST

Project Number: 170697301

Serial_No:04062316:31
Lab Number: L2316799

Report Date: 04/06/23

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controller Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L2316799-01	SV01_033023	01616	Flow 2	03/30/23	418249		-	-	-	Pass	39.7	39.6	0
L2316799-01	SV01_033023	2283	6.0L Can	03/30/23	418249	L2315825-04	Pass	-30.0	-4.0	-	-	-	-
L2316799-02	SV02_033023	01451	Flow 2	03/30/23	418249		-	-	-	Pass	40.0	40.4	1
L2316799-02	SV02_033023	3325	6.0L Can	03/30/23	418249	L2315825-04	Pass	-29.9	-3.9	-	-	-	-
L2316799-03	SV03_033023	0417	Flow 2	03/30/23	418249		-	-	-	Pass	40.0	39.5	1
L2316799-03	SV03_033023	1060	6.0L Can	03/30/23	418249	L2315825-04	Pass	-30.0	-4.8	-	-	-	-
L2316799-04	SV04_033023	01589	Flow 2	03/30/23	418249		-	-	-	Pass	40.2	42.4	5
L2316799-04	SV04_033023	2265	6.0L Can	03/30/23	418249	L2315825-04	Pass	-30.0	-3.7	-	-	-	-
L2316799-05	AA01_033023	01707	Flow 2	03/30/23	418249		-	-	-	Pass	40.0	40.3	1
L2316799-05	AA01_033023	2907	6.0L Can	03/30/23	418249	L2315825-04	Pass	-30.1	-4.5	-	-	-	-

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2315825
Report Date: 04/06/23

Air Canister Certification Results

Lab ID: L2315825-04
Client ID: CAN 3043 SHELF 46
Sample Location:

Date Collected: 03/24/23 17:00
Date Received: 03/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Analytical Method: 48,TO-15
Analytical Date: 03/26/23 21:07
Analyst: TJS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2315825
Report Date: 04/06/23

Air Canister Certification Results

Lab ID: L2315825-04
Client ID: CAN 3043 SHELF 46
Sample Location:

Date Collected: 03/24/23 17:00
Date Received: 03/26/23
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
Xylenes, total	ND	0.600	--	ND	0.869	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,2-Dichloroethene (total)	ND	1.00	--	ND	1.00	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2315825

Report Date: 04/06/23

Air Canister Certification Results

Lab ID: L2315825-04
Client ID: CAN 3043 SHELF 46
Sample Location:

Date Collected: 03/24/23 17:00
Date Received: 03/26/23
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2315825
Report Date: 04/06/23

Air Canister Certification Results

Lab ID: L2315825-04
Client ID: CAN 3043 SHELF 46
Sample Location:

Date Collected: 03/24/23 17:00
Date Received: 03/26/23
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1



Project Name: BATCH CANISTER CERTIFICATION**Lab Number:** L2315825**Project Number:** CANISTER QC BAT**Report Date:** 04/06/23**Air Canister Certification Results**

Lab ID: L2315825-04

Date Collected: 03/24/23 17:00

Client ID: CAN 3043 SHELF 46

Date Received: 03/26/23

Sample Location:

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								

Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds				

No Tentatively Identified Compounds

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	94		60-140
Bromochloromethane	98		60-140
chlorobenzene-d5	92		60-140



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2315825
Report Date: 04/06/23

Air Canister Certification Results

Lab ID: L2315825-04
Client ID: CAN 3043 SHELF 46
Sample Location:

Date Collected: 03/24/23 17:00
Date Received: 03/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Analytical Method: 48,TO-15-SIM
Analytical Date: 03/26/23 21:07
Analyst: TJS

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.100	--	ND	0.264	--		1
Acrolein	ND	0.050	--	ND	0.115	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1



Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L2315825
Report Date: 04/06/23

Air Canister Certification Results

Lab ID: L2315825-04
Client ID: CAN 3043 SHELF 46
Sample Location:

Date Collected: 03/24/23 17:00
Date Received: 03/26/23
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.100	--	ND	0.377	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.100	--	ND	0.461	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
Benzyl chloride	ND	0.100	--	ND	0.518	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1



Project Name: BATCH CANISTER CERTIFICATION**Lab Number:** L2315825**Project Number:** CANISTER QC BAT**Report Date:** 04/06/23**Air Canister Certification Results**

Lab ID: L2315825-04

Date Collected: 03/24/23 17:00

Client ID: CAN 3043 SHELF 46

Date Received: 03/26/23

Sample Location:

Field Prep: Not Specified

Sample Depth:

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	95		60-140
bromochloromethane	100		60-140
chlorobenzene-d5	94		60-140



Project Name: 2731 12TH ST**Lab Number:** L2316799**Project Number:** 170697301**Report Date:** 04/06/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information**Cooler** **Custody Seal**

NA Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2316799-01A	Canister - 2.7 Liter	NA	NA			Y	Absent		TO15-LL(30)
L2316799-02A	Canister - 2.7 Liter	NA	NA			Y	Absent		TO15-LL(30)
L2316799-03A	Canister - 2.7 Liter	NA	NA			Y	Absent		TO15-LL(30)
L2316799-04A	Canister - 2.7 Liter	NA	NA			Y	Absent		TO15-LL(30)
L2316799-05A	Canister - 2.7 Liter	NA	NA			Y	Absent		TO15-LL(30)

Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
	Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report



Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report



Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

Data Qualifiers

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: 2731 12TH ST
Project Number: 170697301

Lab Number: L2316799
Report Date: 04/06/23

REFERENCES

- 48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 19

Published Date: 4/2/2021 1:14:23 PM

Page 1 of 1

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:**Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H-B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



AIR ANALYSIS

CHAIN OF CUSTODY

PAGE 1 OF 1

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: Langan
Address: 360 W 31st St, NY
NY 10001
Phone: 212-479-5400
Fax:

Email: eadkins@langan.com

☐ These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments:

Project-Specific Target Compound List: ☐

Project Information

Project Name: 2731 12th St
Project Location: 2731 12th St, Brooklyn, NY
Project #: 170697301
Project Manager: Elizabeth Adkins
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Time:

Date Rec'd in Lab:

3/31/23

Report Information - Data Deliverables

☐ FAX
☐ ADEx

Criteria Checker:
(Default based on Regulatory Criteria Indicated)

Other Formats:

☐ EMAIL (standard pdf report)
☐ Additional Deliverables: ASP-B

Report to: (if different than Project Manager)

ALPHA Job #: L2316799

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program Res / Comm

ANALYSIS

☐ TO-15
☐ TO-15 SIM
☐ APH
☐ Fixed Gases
☐ Sulfides & Mercaptans by TO-15

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	COLLECTION										TO-15	TO-15 SIM	APH	Fixed Gases	Sulfides & Mercaptans	Sample Comments (i.e. PID)
		End Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	ID Can	ID - Flow Controller						
16799-01	SV01-033023	033023	1214	1410	-30.9	-5.1	SV	CQ	6L	2283	01616	X					
-02	SV02-033023	↓	1325	1511	-30.8	-5.0	SV	↓	6L	3325	01451	X					
-03	SV03-033023		1436	1636	-30.6	-5.9	SV		6L	1060	0417	X					
-04	SV04-033023		1155	1332	-31.6	-5.1	SV		6L	2265	01589	X					
-05	AA01-033023		✓	1232	1432	-30.8	-5.8		AA	↓	6L	2907	01707	X			

*SAMPLE MATRIX CODES

AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Relinquished By:

Camille Quick (Langan)
CSTAC

Date/Time

3/30/23 17:30
3/30/23 20:03
3-30-23 0030
3-31-23 0435

Received By:

GJAC (AAW)

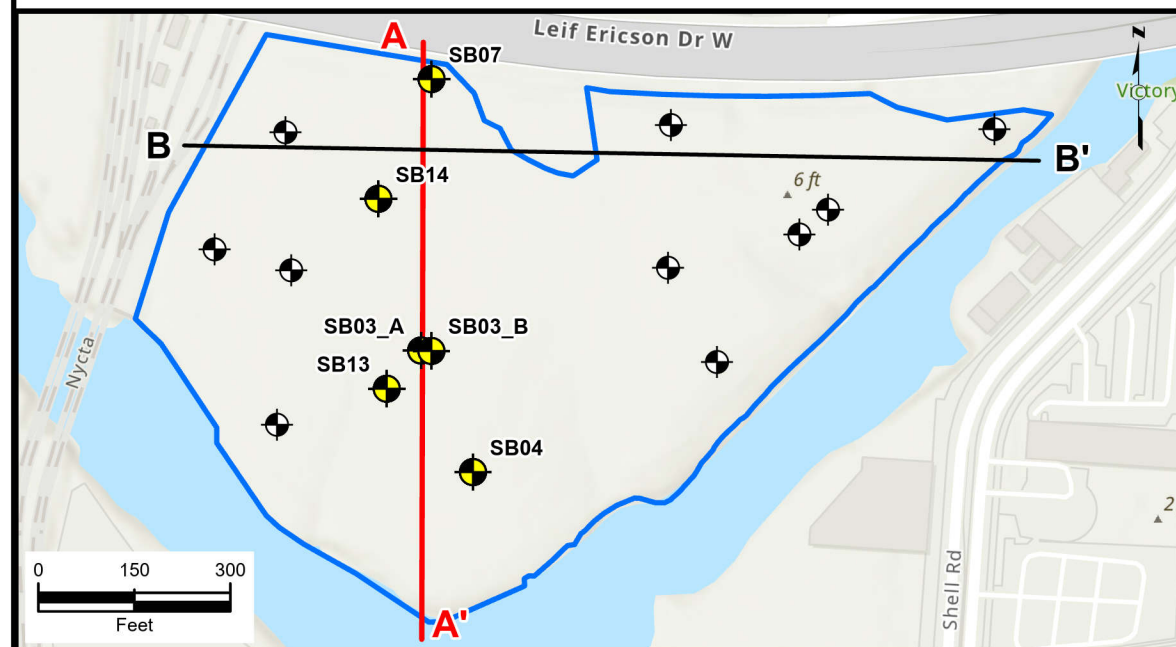
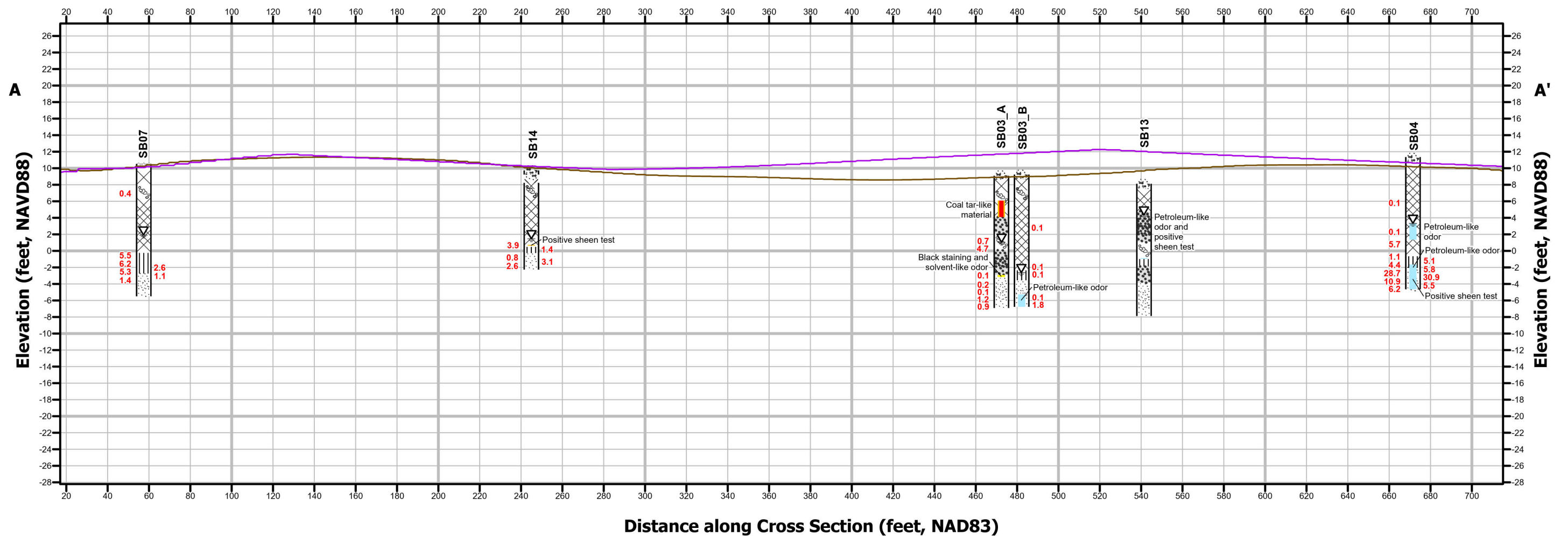
Date/Time:

3/30/23 17:30
3-30-23 2100
3-31-23 0030
3-31-23 0435

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

ATTACHMENT 2

SUBSURFACE PROFILES



Legend

- Boring Location shown in Subsurface Profile A-A'
- Sample Location
- Proposed Grading Surface
- Existing Ground Surface
- A-A' Section Line
- B-B' Section Line
- Approximate Site Boundary

- Asphalt
- Topsoil
- Fill
- Gravel
- Silt
- Sand
- Concrete
- Blebs, Globbs, and Sheen

- Tar Saturated
- Staining, Odor
- Petroleum Impacts Saturation & Sheens
- Petroleum Impacts Staining and Odor
- Groundwater Elevation
- PID Readings (ppm)

- Notes:**
- Vertical exaggeration 1:4
 - This profile represents a generalized soil cross section depicting location, elevation, and environmental properties between points of exploration; variations in subsurface conditions should be expected between borings.
 - NAVD88 = North American Vertical Datum of 1988
 - NAD83 = North American Datum of 1983

LANGAN

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.

368 9th Avenue, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project

**2731 WEST
12TH STREET**

BLOCK No. 7247, LOT No. 106

BROOKLYN

KINGS COUNTY

NEW YORK

Figure Title

**SUBSURFACE
PROFILE A - A'**

Project No.

170697301

Date

4/21/2025

Scale

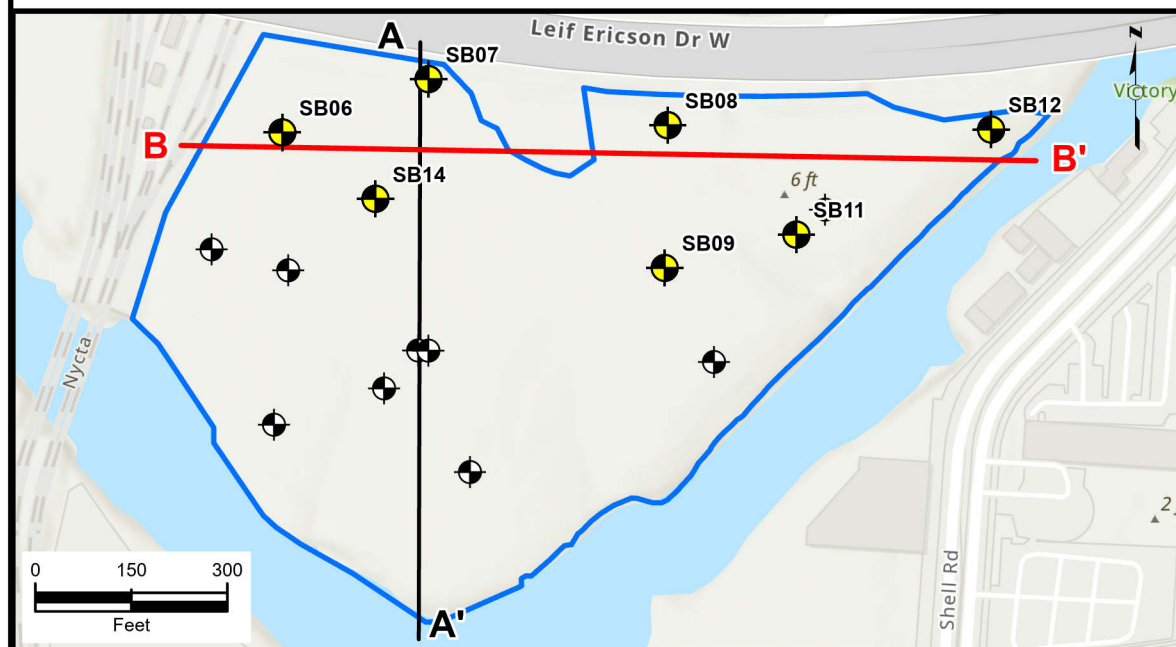
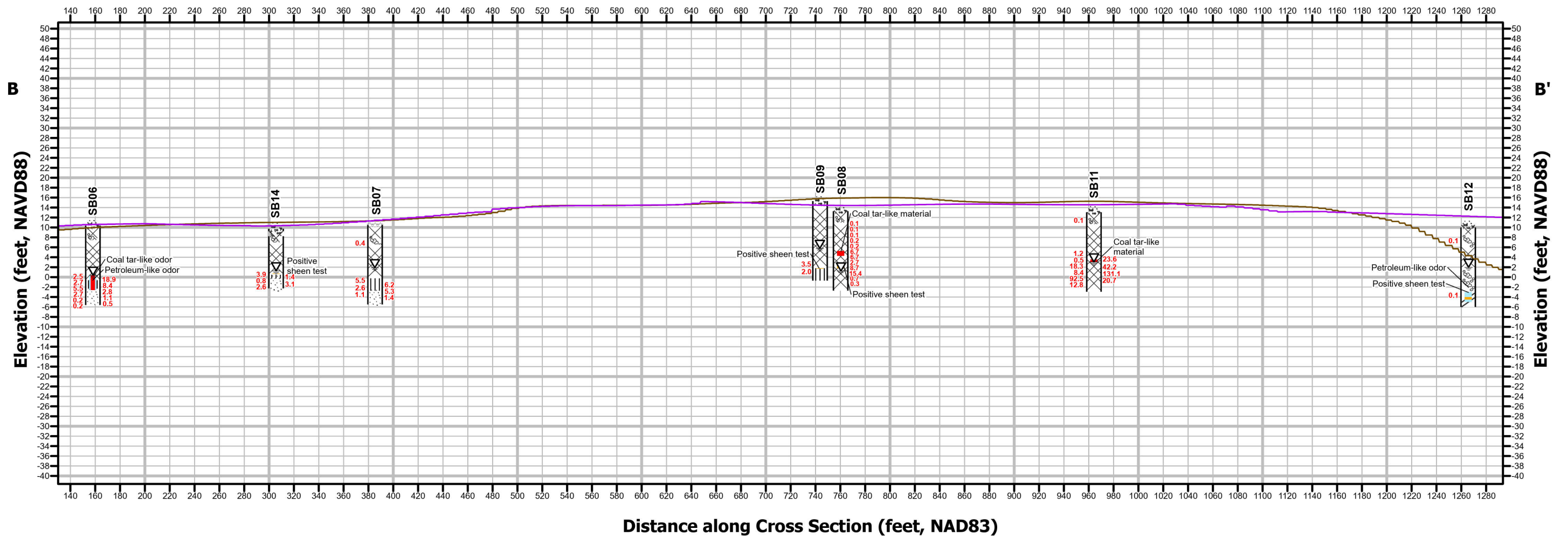
AS SHOWN

Drawn By

GS

Figure

6A



Legend

- Boring Location shown in Subsurface Profile B-B'
- Sample Location
- Proposed Grading Surface
- Existing Ground Surface
- A-A' Section Line
- B-B' Section Line
- Approximate Site Boundary
- Asphalt
- Topsoil
- Fill
- Gravel
- Silt
- Sand
- Clay
- Blebs, Globbs, and Sheen
- Tar Saturated
- Petroleum Impacts Staining and Odor
- Groundwater Elevation
- PID Readings (ppm)

- Notes:**
- Vertical exaggeration 1:4
 - This profile represents a generalized soil cross section depicting location, elevation, and environmental properties between points of exploration; variations in subsurface conditions should be expected between borings.
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LANGAN

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Landscape Architecture and Geology, D.P.C.

368 9th Avenue, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project

**2731 WEST
12TH STREET**

BLOCK No. 7247, LOT No. 106

BROOKLYN

KINGS COUNTY

Figure Title

**SUBSURFACE
PROFILE B - B'**

Project No.

170697301

Date

4/21/2025

Scale

AS SHOWN

Drawn By

GS

Figure

6B

ATTACHMENT 3

SITE LOCATION MAP AND SITE PLAN



WARNING: It is a violation of the NYS Education Law Article 145 for any person, unless acting under the direction of a licensed professional engineer, land surveyor or geologist, to alter this item in any way.



Notes:
 1. Aerial imagery provided through Langan's subscription to NearMap.com, flown 07/19/2022.
 2. Parcel data provided by the New York City Department of City Planning.

LANGAN

368 Ninth Avenue, 8th Floor
 New York, NY 10001-2727
 T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering & Environmental Services, Inc.
 Langan Engineering, Environmental, Surveying,
 Landscape Architecture and Geology, D.P.C.
 Langan International LLC

Collectively known as Langan

Project

**2731 WEST 12TH
 STREET**

BROOKLYN

KINGS COUNTY

NEW YORK

Figure Title

**SITE LOCATION
 MAP**

Project No.
170697301

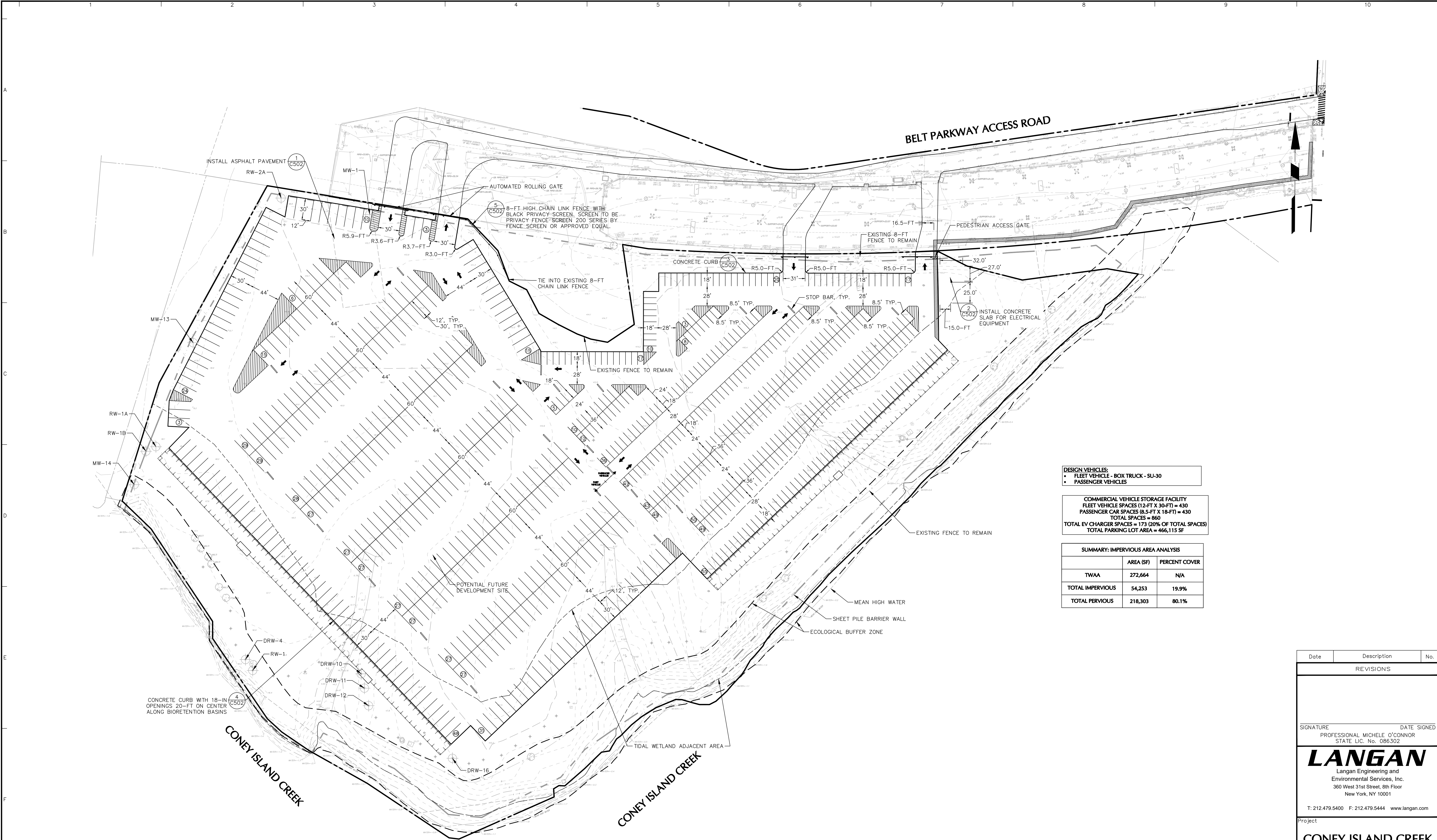
Date
5/11/2023

Scale
1"=400'

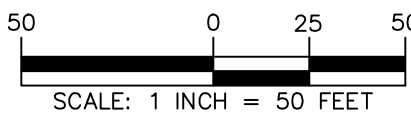
Drawn By
GS

Figure No.

2



SITE PLAN
SCALE: 1" = 50'



- GENERAL NOTES:
- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C.; DATED DECEMBER 20, 2023.
 - ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929, (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).
 - ECOLOGICAL BUFFER ZONE AND SHEET PILE BARRIER WALL LOCATIONS EXTRACTED FROM "FIGURE 11 - ENGINEERING CONTROLS LOCATIONS" FROM THE JUNE 2023 SITE MANAGEMENT PLAN, PREPARED BY GEI CONSULTANTS FOR THE FORMER BROOKLYN BOROUGH (CONEY ISLAND) GAS WORKS SITE.
 - FIRE FIGHTER AISLES HAVE BEEN PROVIDED THROUGHOUT, IN ACCORDANCE WITH SECTION 406.9.7.4, ENSURING GENERAL COMPLIANCE WITH SECTION 406.9.7 OF THE NYC DOB BUILDING CODE.
 - ASPHALT PAVEMENT SURFACE HAS BEEN PROVIDED IN COMPLIANCE WITH SECTION 406.9.4 OF THE NYC DOB BUILDING CODE.

LEGEND

- PROPERTY LINE
TIDAL WETLAND ADJACENT AREA EXTENTS
LIMITS OF ECOLOGICAL BUFFER ZONE
SEALED-SEAM SHEET PILE BARRIER WALL
APPROXIMATE LOCATION OF ACTIVE MONITORING/RECOVERY WELLS

DESIGN VEHICLES:

- FLEET VEHICLE - BOX TRUCK - SU-30
- PASSENGER VEHICLES

COMMERCIAL VEHICLE STORAGE FACILITY

FLEET VEHICLE SPACES (12-FT X 30-FT) =	430
PASSENGER CAR SPACES (8.5-FT X 18-FT) =	430
TOTAL SPACES =	860
TOTAL EV CHARGER SPACES =	173 (20% OF TOTAL SPACES)
TOTAL PARKING LOT AREA =	466,115 SF

SUMMARY: IMPERVIOUS AREA ANALYSIS

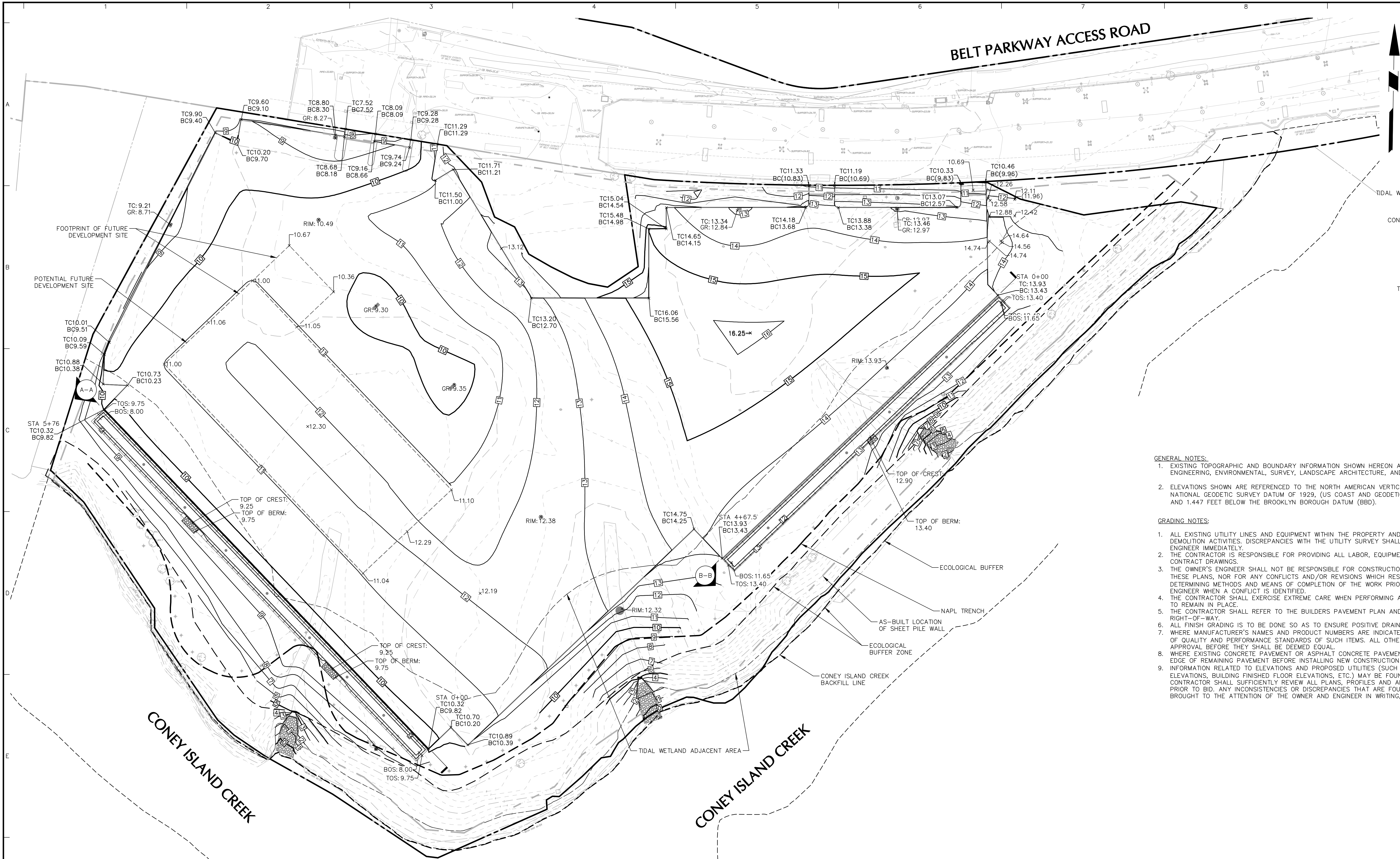
	AREA (SF)	PERCENT COVER
TWAA	272,664	N/A
TOTAL IMPERVIOUS	54,253	19.9%
TOTAL PERVIOUS	218,303	80.1%

Date	Description	No.
REVISIONS		
SIGNATURE PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		
DATE SIGNED		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project		
CONEY ISLAND CREEK 2626 SHORE PARKWAY BLOCK No. 7247, LOT No. 106 BROOKLYN KINGS COUNTY NEW YORK		
Drawing Title		
SITE PLAN		
Project No.	Drawing No.	
170697301	C-201	
Date	03/06/2025	
Drawn By	MG	
Checked By	BC	
Sheet		5 of 15

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

ATTACHMENT 4

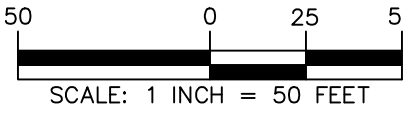
DRAINAGE, UTILITY, AND FOUNDATION PLAN SETS



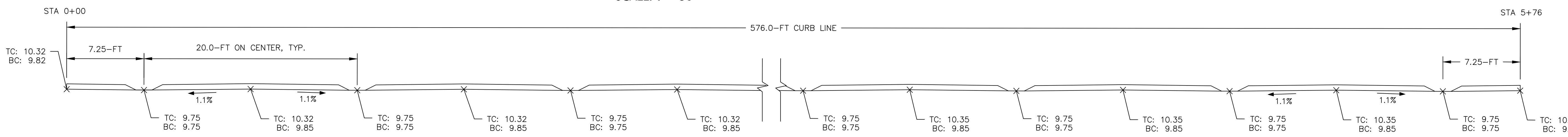
LEGEND	
PROPERTY LINE	---
AS-BUILT SHEET PILE WALL	- - - -
NAPL TRENCH	- - - -
TIDAL WETLAND ADJACENT AREA (TWAA)	- - - -
ECOLOGICAL BUFFER	- - - -
CONEY ISLAND CREEK BACKFILL LINE	- - - -
PROPOSED ELEVATION	XX.XX
EXISTING ELEVATION	XX.XX
GRATE ELEVATION	GR: XX.XX
RIM ELEVATION	RIM: XX.XX
TOP/BOTTOM OF CURB ELEVATION	TCXX.XX BCXX.XX
TOP OF SLOPE ELEVATION	TOS: XX.XX
BOTTOM OF SLOPE ELEVATION	BOS: XX.XX
CONTOUR LINE	XX

- GENERAL NOTES:**
- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON AS PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C., DATED OCTOBER 26, 2022.
 - ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929. (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).
- GRADING NOTES:**
- ALL EXISTING UTILITY LINES AND EQUIPMENT WITHIN THE PROPERTY AND LIMIT OF WORK SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION ACTIVITIES. DISCREPANCIES WITH THE UTILITY SURVEY SHALL BE IDENTIFIED. CONTRACTOR SHALL NOTIFY THE MEP AND CIVIL ENGINEER IMMEDIATELY.
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR, EQUIPMENT, AND MATERIALS AS REQUIRED FOR THE WORK SHOWN ON THE CONTRACT DRAWINGS.
 - THE OWNER'S ENGINEER SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION METHODS AND MEANS FOR COMPLETION OF THE WORK DEPICTED ON THESE PLANS, NOR FOR ANY CONFLICTS AND/OR REVISIONS WHICH RESULT FROM THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING METHODS AND MEANS OF COMPLETION OF THE WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND NOTIFY THE OWNER'S ENGINEER WHEN A CONFLICT IS IDENTIFIED.
 - THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN PERFORMING ANY WORK ACTIVITIES ADJACENT TO EXISTING WALLS AND BUILDING WALLS TO REMAIN IN PLACE.
 - THE CONTRACTOR SHALL REFER TO THE BUILDERS PAVEMENT PLAN AND SCARA FOR SIDEWALK, CURB AND ROADWAY WORK WITHIN THE RIGHT-OF-WAY.
 - ALL FINISH GRADING IS TO BE DONE SO AS TO ENSURE POSITIVE DRAINAGE TOWARD THE APPROPRIATE DRAINAGE STRUCTURES.
 - WHERE MANUFACTURER'S NAMES AND PRODUCT NUMBERS ARE INDICATED ON DRAWINGS, IT SHALL BE CONSTRUED TO MEAN THE ESTABLISHMENT OF QUALITY AND PERFORMANCE STANDARDS OF SUCH ITEMS. ALL OTHER PRODUCTS MUST BE SUBMITTED TO THE OWNER'S ENGINEER FOR APPROVAL BEFORE THEY SHALL BE DEEMED EQUAL.
 - WHERE EXISTING CONCRETE PAVEMENT OR ASPHALT CONCRETE PAVEMENT ARE REMOVED, THE CONTRACTOR SHALL SAWCUT AND NEATLY TRIM EDGE OF REMAINING PAVEMENT BEFORE INSTALLING NEW CONSTRUCTION.
 - INFORMATION RELATED TO ELEVATIONS AND PROPOSED UTILITIES (SUCH AS ROADWAY GRADES, INVERT ELEVATIONS, RIM ELEVATIONS, GRATE ELEVATIONS, BUILDING FINISHED FLOOR ELEVATIONS, ETC.) MAY BE FOUND IN MORE THAN ONE LOCATION IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL SUFFICIENTLY REVIEW ALL PLANS, PROFILES AND ANY OTHER INFORMATION IN THE CONTRACT DOCUMENTS FOR CONSISTENCY PRIOR TO BID. ANY INCONSISTENCIES OR DISCREPANCIES THAT ARE FOUND BY THE CONTRACTOR OR HIS ASSIGNS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER IN WRITING, IN THE FORMAT OF AN RFI PRIOR TO BID.

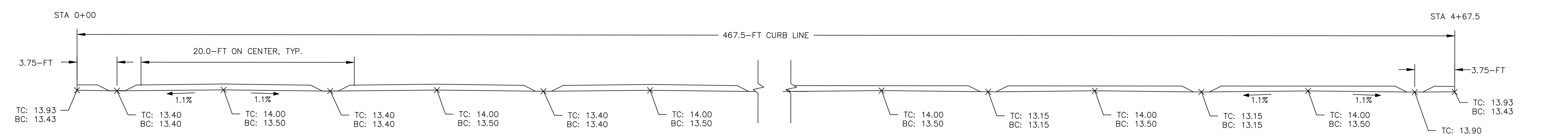
GRADING PLAN
SCALE: 1" = 50'



SECTION A-A
SCALE: 1" = 5'

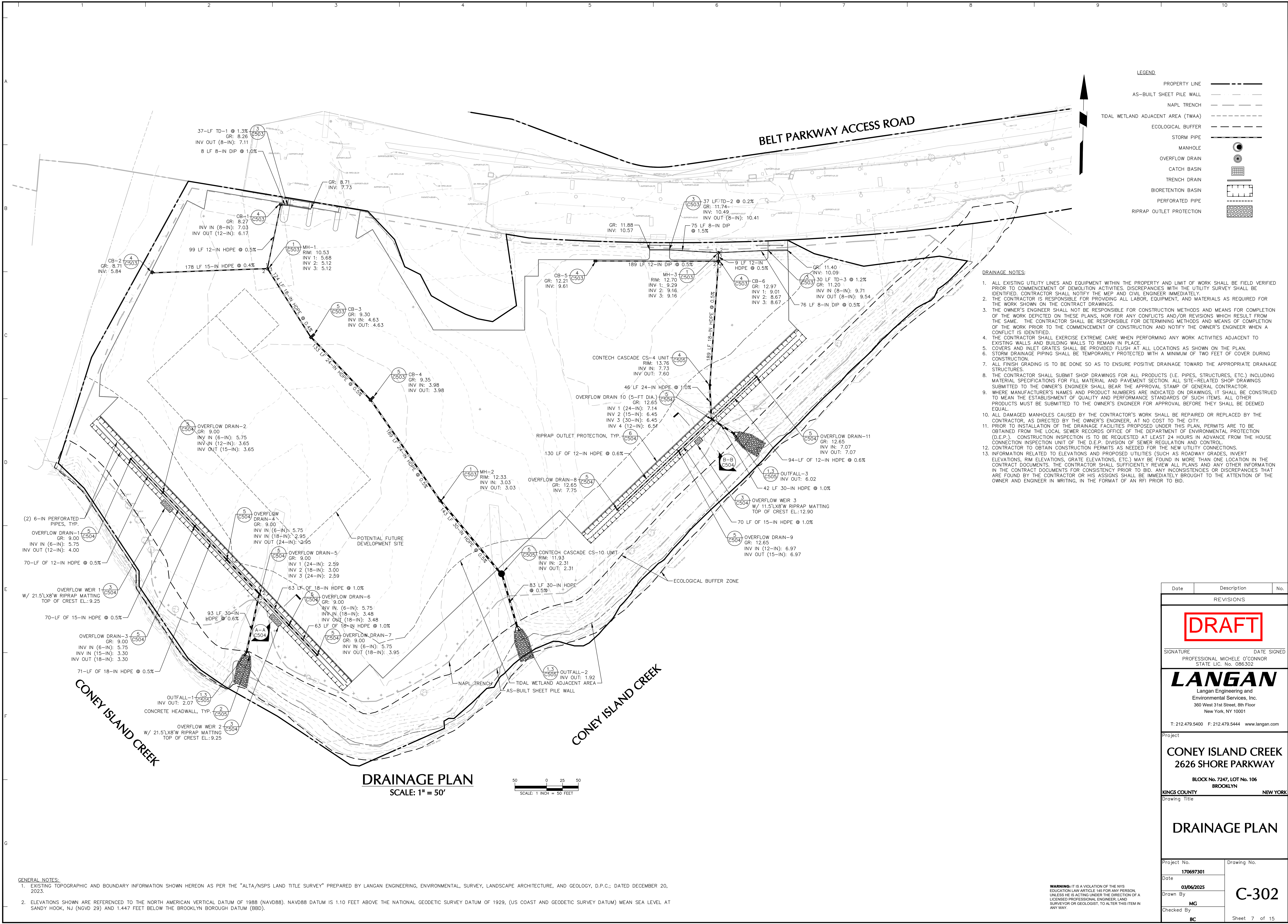


SECTION B-B
SCALE: 1" = 5'



Date	Description	No.
REVISIONS		
<div>DRAFT</div>		
SIGNATURE _____ DATE SIGNED _____ PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		
<div>LANGAN</div> <p>Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001</p> <p>T: 212.479.5400 F: 212.479.5444 www.langan.com</p>		
Project CONEY ISLAND CREEK 2626 SHORE PARKWAY BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY Drawing Title GRADING PLAN		
Project No. 170697301		C-301
Date 03/06/2025		
Drawn By MG		
Checked By BC		
Sheet 6 of 15		

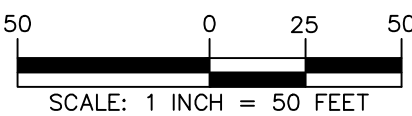
WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.



LEGEND		
PROPERTY LINE		---
AS-BUILT SHEET PILE WALL		---
NAPL TRENCH		---
TIDAL WETLAND ADJACENT AREA (TWAA)		---
ECOLOGICAL BUFFER		---
STORM PIPE		---
MANHOLE		○
OVERFLOW DRAIN		○
CATCH BASIN		□
TRENCH DRAIN		---
BIORETENTION BASIN		---
PERFORATED PIPE		---
RIPRAP OUTLET PROTECTION		---

- DRAINAGE NOTES:**
- ALL EXISTING UTILITY LINES AND EQUIPMENT WITHIN THE PROPERTY AND LIMIT OF WORK SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION ACTIVITIES. DISCREPANCIES WITH THE UTILITY SURVEY SHALL BE IDENTIFIED. CONTRACTOR SHALL NOTIFY THE MEP AND CIVIL ENGINEER IMMEDIATELY.
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR, EQUIPMENT, AND MATERIALS AS REQUIRED FOR THE WORK SHOWN ON THE CONTRACT DRAWINGS.
 - THE OWNER'S ENGINEER SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION METHODS AND MEANS FOR COMPLETION OF THE WORK DEPICTED ON THESE PLANS, NOR FOR ANY CONFLICTS AND/OR REVISIONS WHICH RESULT FROM THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING METHODS AND MEANS OF COMPLETION OF THE WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND NOTIFY THE OWNER'S ENGINEER WHEN A CONFLICT IS IDENTIFIED.
 - THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN PERFORMING ANY WORK ACTIVITIES ADJACENT TO EXISTING WALLS AND BUILDING WALLS TO REMAIN IN PLACE.
 - COVERS AND INLET GRATES SHALL BE PROVIDED FLUSH AT ALL LOCATIONS AS SHOWN ON THE PLAN.
 - STORM DRAINAGE PIPING SHALL BE TEMPORARILY PROTECTED WITH A MINIMUM OF TWO FEET OF COVER DURING CONSTRUCTION.
 - ALL FINISH GRADING IS TO BE DONE SO AS TO ENSURE POSITIVE DRAINAGE TOWARD THE APPROPRIATE DRAINAGE STRUCTURES.
 - THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL PRODUCTS (I.E. PIPES, STRUCTURES, ETC.) INCLUDING MATERIAL SPECIFICATIONS FOR FILL MATERIAL AND PAVEMENT SECTION. ALL SITE-RELATED SHOP DRAWINGS SUBMITTED TO THE OWNER'S ENGINEER SHALL BEAR THE APPROVAL STAMP OF GENERAL CONTRACTOR.
 - WHERE MANUFACTURER'S NAMES AND PRODUCT NUMBERS ARE INDICATED ON DRAWINGS, IT SHALL BE CONSTRUED TO MEAN THE ESTABLISHMENT OF QUALITY AND PERFORMANCE STANDARDS OF SUCH ITEMS. ALL OTHER PRODUCTS MUST BE SUBMITTED TO THE OWNER'S ENGINEER FOR APPROVAL BEFORE THEY SHALL BE DEEMED EQUAL.
 - ALL DAMAGED MANHOLES CAUSED BY THE CONTRACTOR'S WORK SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS DIRECTED BY THE OWNER'S ENGINEER, AT NO COST TO THE CITY.
 - PRIOR TO INSTALLATION OF THE DRAINAGE FACILITIES PROPOSED UNDER THIS PLAN, PERMITS ARE TO BE OBTAINED FROM THE LOCAL SEWER RECORDS OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (D.E.P.). CONSTRUCTION INSPECTION IS TO BE REQUESTED AT LEAST 24 HOURS IN ADVANCE FROM THE HOUSE CONNECTION INSPECTION UNIT OF THE D.E.P. DIVISION OF SEWER REGULATION AND CONTROL.
 - CONTRACTOR TO OBTAIN CONSTRUCTION PERMITS AS NEEDED FOR THE NEW UTILITY CONNECTIONS.
 - INFORMATION RELATED TO ELEVATIONS AND PROPOSED UTILITIES (SUCH AS ROADWAY GRADES, INVERT ELEVATIONS, RIM ELEVATIONS, GRATE ELEVATIONS, ETC.) MAY BE FOUND IN MORE THAN ONE LOCATION IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL SUFFICIENTLY REVIEW ALL PLANS AND ANY OTHER INFORMATION IN THE CONTRACT DOCUMENTS FOR CONSISTENCY PRIOR TO BID. ANY INCONSISTENCIES OR DISCREPANCIES THAT ARE FOUND BY THE CONTRACTOR OR HIS ASSIGNS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER IN WRITING, IN THE FORMAT OF AN RFI PRIOR TO BID.

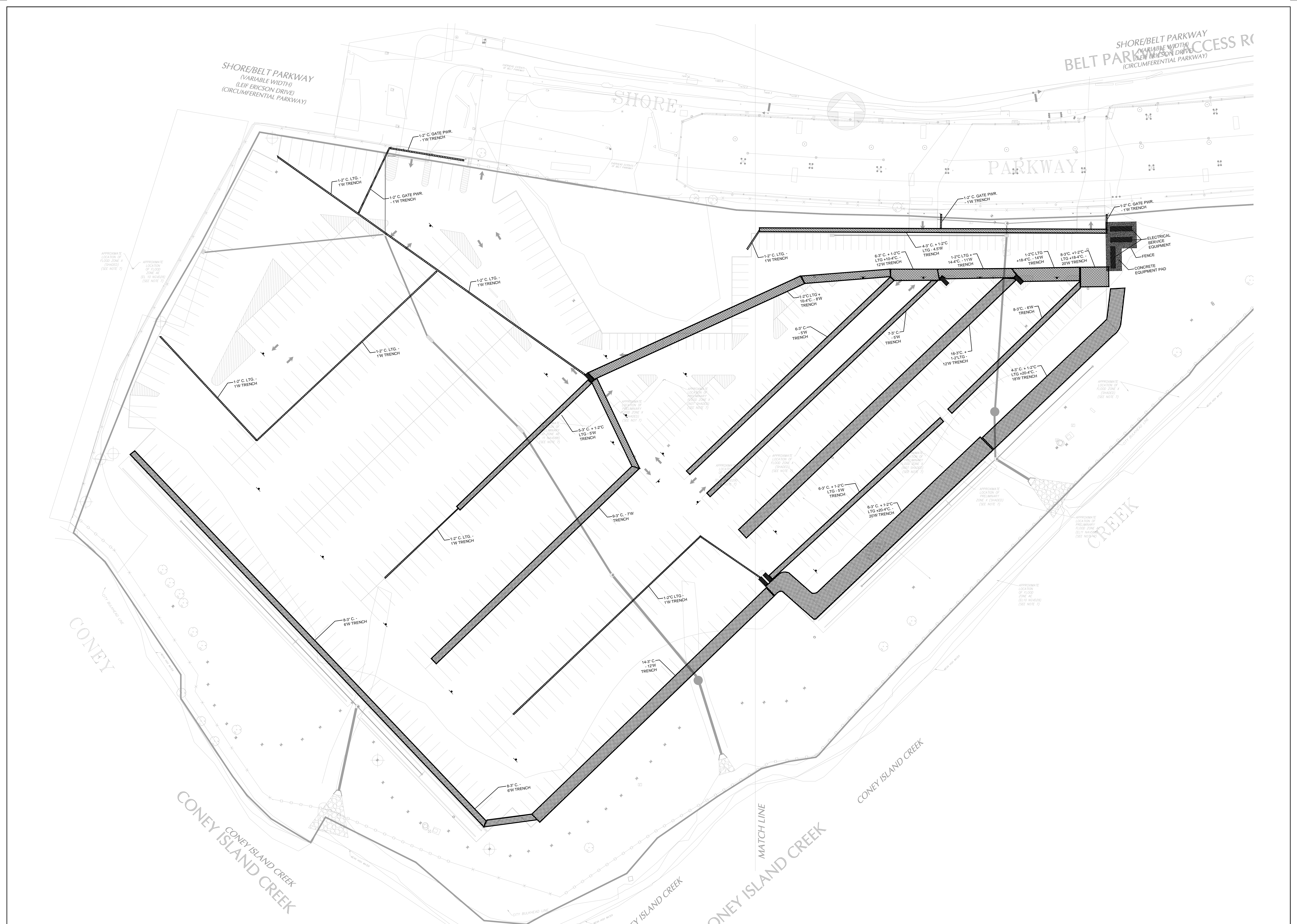
DRAINAGE PLAN
SCALE: 1" = 50'



- GENERAL NOTES:**
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Date	Description	No.
REVISIONS		
DRAFT		
SIGNATURE	DATE SIGNED	
PROFESSIONAL MICHELE O'CONNOR		
STATE LIC. No. 086302		
LANGAN		
Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001		
T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project		
CONEY ISLAND CREEK		
2626 SHORE PARKWAY		
BLOCK No. 7247, LOT No. 106 BROOKLYN		
KINGS COUNTY NEW YORK		
Drawing Title		
DRAINAGE PLAN		
Project No.	Drawing No.	
170697301		
Date		
03/06/2025		
Drawn By		
MG		
Checked By		
BC		
		C-302
		Sheet 7 of 15



				<div>Casertini ASSOCIATES CONSULTING ENGINEERS</div>	PROJECT: Prologis - Coney Island EV Charging Facility 2731 West 12th Street, Coney Island, NY	DATE: 08/30/24 JOB NO.: 240232 DRAWN: CAD CHECKED: GG	DESCRIPTION: ELECTRICAL SITE PLAN - ELECTRICAL TRENCHING LAYOUT	SCALE: 1" = 30' SKETCH NO.: SKE-001R3
					REFERENCE DWG: N/A			
NO.	BY	REVISION	DATE					

ATTACHMENT 5
DETAIL DRAWINGS

GENERAL

- ## COMPLIANCE

3. ALL SITE LIGHTING RELATED WORK AND MATERIALS SHALL COMPLY WITH CITY, COUNTY, AND OTHER APPLICABLE GOVERNING AUTHORITY REQUIREMENTS.
4. LIGHTING LAYOUT COMPLIES WITH THE ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA) SAFETY STANDARDS FOR LIGHT LEVELS.

COORDINATION

5. CONTRACTOR TO COORDINATE POWER SOURCE WITH LIGHT FIXTURES TO ENSURE ALL SITE LIGHTING IS OPERATING EFFECTIVELY, EFFICIENTLY AND SAFELY.
6. REFER TO ELECTRIFICATION PLAN FOR PROVIDING ADEQUATE POWER FOR SITE LIGHTING.
7. CONTRACTOR TO COORDINATE LOCATION OF EASEMENTS, UNDERGROUND UTILITIES AND DRAINAGE BEFORE DRILLING POLE BASES.
8. INSTALLATION OF ALL LIGHTING FIXTURES, POLES, FOOTINGS, AND FEEDER CABLE TO BE COORDINATED WITH ALL SITE WORK TRADES TO AVOID CONFLICT WITH FINISHED AND PROPOSED WORK.
9. CONTRACTOR TO COORDINATE INSTALLATION OF UNDERGROUND FEEDER CABLE FOR EXTERIOR LIGHTING WITH EXISTING AND PROPOSED UTILITY SYSTEMS. CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER'S REPRESENTATIVE SHOULD ANY UTILITIES, NOT SHOWN ON THE PLANS, BE FOUND DURING EXCAVATIONS.

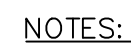
POLES AND FOOTINGS

10. PROVIDE A CONCRETE BASE FOR EACH LIGHT POLE AT THE LOCATIONS INDICATED ON THE CONSTRUCTION DRAWINGS AND/OR IN ACCORDANCE WITH PROJECT PLANS AND SPECIFICATIONS RELATING DIRECTLY TO CAST-IN-PLACE CONCRETE. THE USE OF ALTERNATE LIGHTING FOUNDATIONS, SUCH AS PRECAST, MAY BE USED IF THE SIZE AND STRENGTH REQUIREMENTS FROM THE PLANS ARE MAINTAINED. THE CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO ORDERING ANY SUBSTITUTED PRODUCTS.
11. CONTRACTOR SHALL EXAMINE AND VERIFY THAT SOIL CONDITIONS ARE SUITABLE TO SUPPORT LOADS EXERTED UPON THE FOUNDATIONS DURING EXCAVATION. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY UNSATISFACTORY CONDITIONS.
12. POLE FOUNDATIONS SHALL NOT BE POURED IF FREE STANDING WATER IS PRESENT IN EXCAVATED AREA.
13. ALL POLES SHALL BE EQUIPPED WITH FACTORY INSTALLED VIBRATION DAMPENERS.

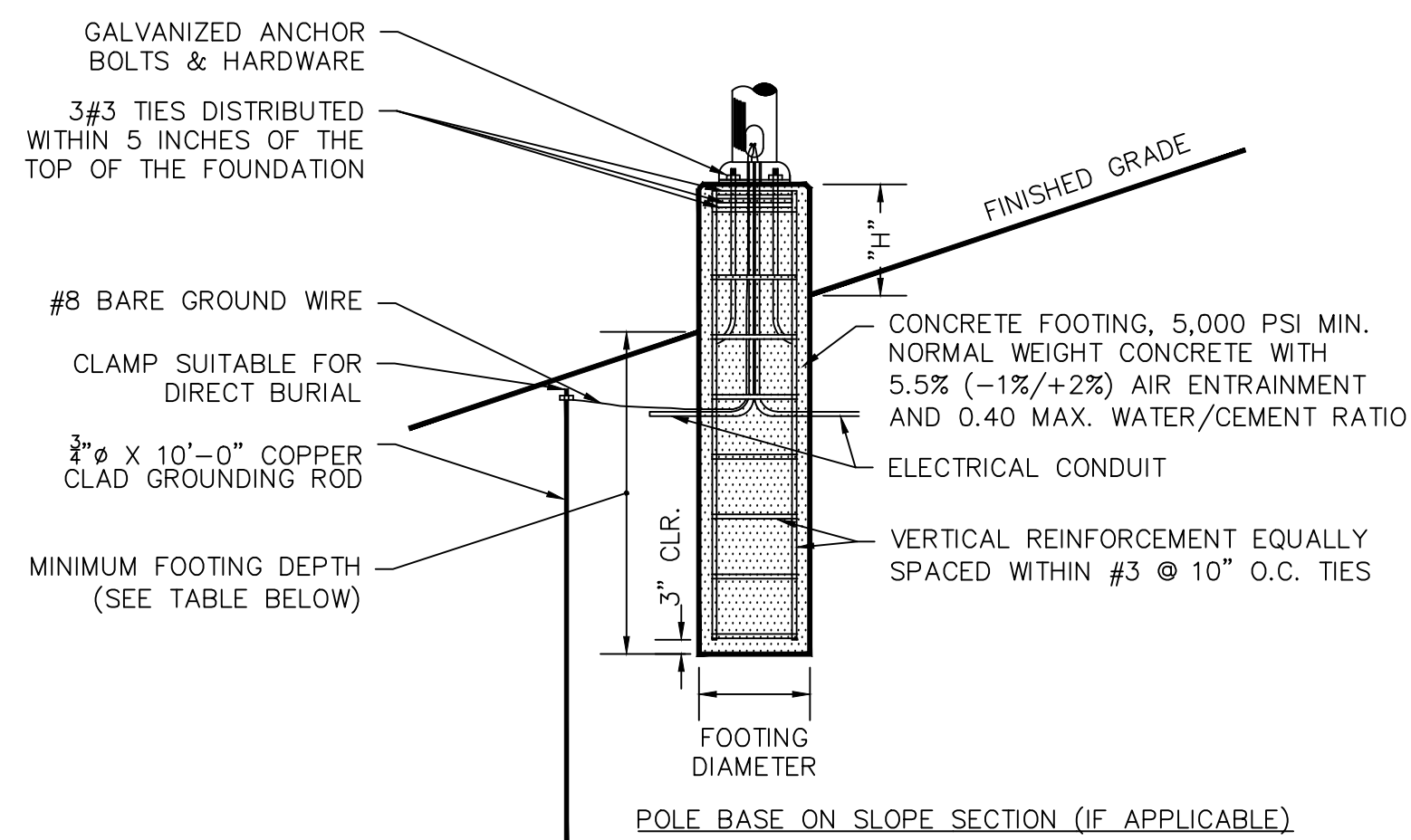
ADJUSTMENT AND INSPECTION

14. CONTRACTOR TO OPERATE EACH LUMINAIRE AFTER INSTALLATION AND CONNECTION. INSPECT FOR IMPROPER CONNECTIONS AND OPERATION.
15. CONTRACTOR TO AIM AND ADJUST ALL LUMINAIRES TO PROVIDE ILLUMINATION LEVELS AND DISTRIBUTION AS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE LANDSCAPE ARCHITECT AND/OR OWNER.
16. CONTRACTOR TO CONFIRM THAT LIGHT FIXTURES, TILT ANGLE AND AIMING MATCH SPECIFICATIONS ON THE PLANS.

NO ALTERNATES WILL BE ACCEPTED



EXPOSED HEIGHT OF POLE BASE (H) SHALL BE MEASURED ON THE UPHILL SIDE OF A SLOPE. FOOTING DEPTH (D) SHALL BE MEASURED ON THE DOWNHILL SIDE OF A SLOPE. AN ADDITIONAL VARIABLE HEIGHT (V) WILL BE BASED ON THE SLOPE ON WHICH THE POLE BASE IS LOCATED. CONTRACTOR TO CALCULATE FULL LENGTH OF EACH POLE BASE REQUIRED ON SLOPES ($H+D+V$ = TOTAL BASE LENGTH)




THE INFORMATION ILLUSTRATED IN THE LIGHT POLE FOUNDATION DETAIL HAS BEEN PROVIDED FOR GENERAL REFERENCE AND PRELIMINARY COST ESTIMATE PURPOSES. LIGHT POLE FOUNDATIONS SHOULD BE DESIGNED AND DETAILED BY A LICENSED STRUCTURAL ENGINEER BASED ON EXISTING SOIL CONDITIONS, LOCAL DESIGN STANDARDS AND MANUFACTURERS RECOMMENDATIONS.



1. ALL LIGHT POLES SHALL BE EQUIPPED WITH FACTORY INSTALLED VIBRATION DAMPENERS.
2. CURB LOCATION IS SHOWN FOR SCHEMATIC PURPOSE. LIGHT POLES SHALL BE LOCATED PER THE LIGHTING PLANS.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		
		
SIGNATURE	02/12/2025	DATE SIGNED
PROFESSIONAL MICHELE E. O'CONNOR STATE LIC. NO. 086302		

LANGAN
Langan Engineering and
Environmental Services, Inc.
360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project

CONEY ISLAND CREEK

2626 SHORE PARKWAY

BLOCK No. 7247, LOT No. 106
BROOKLYN
KINGS COUNTY NEW YORK

Drawing Title

LIGHTING

LIGHTING

NOTES & DETAILS

B01177446-11	
Project No.	Drawing No.

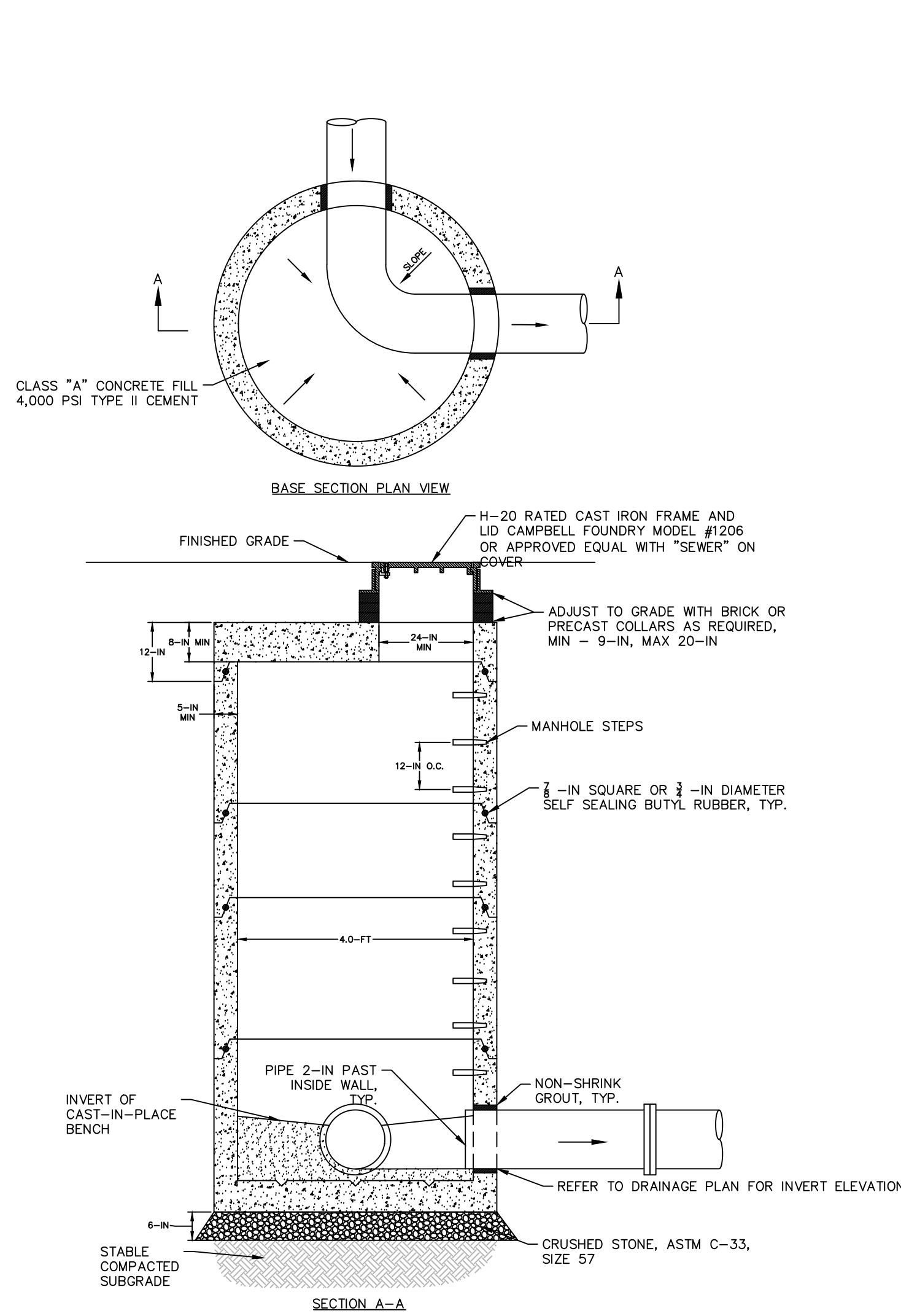
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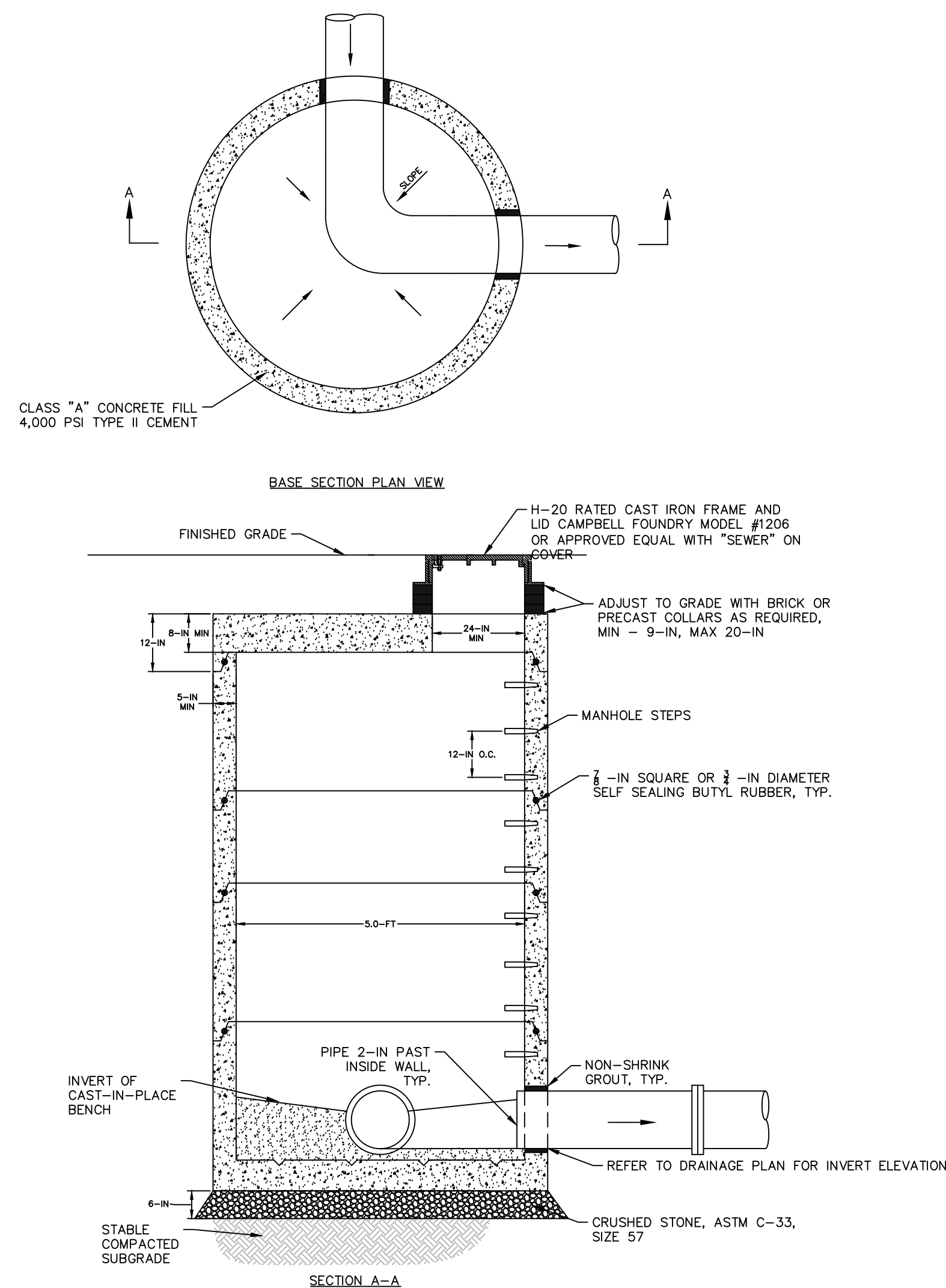
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DB/IC Sheet 8 of 10
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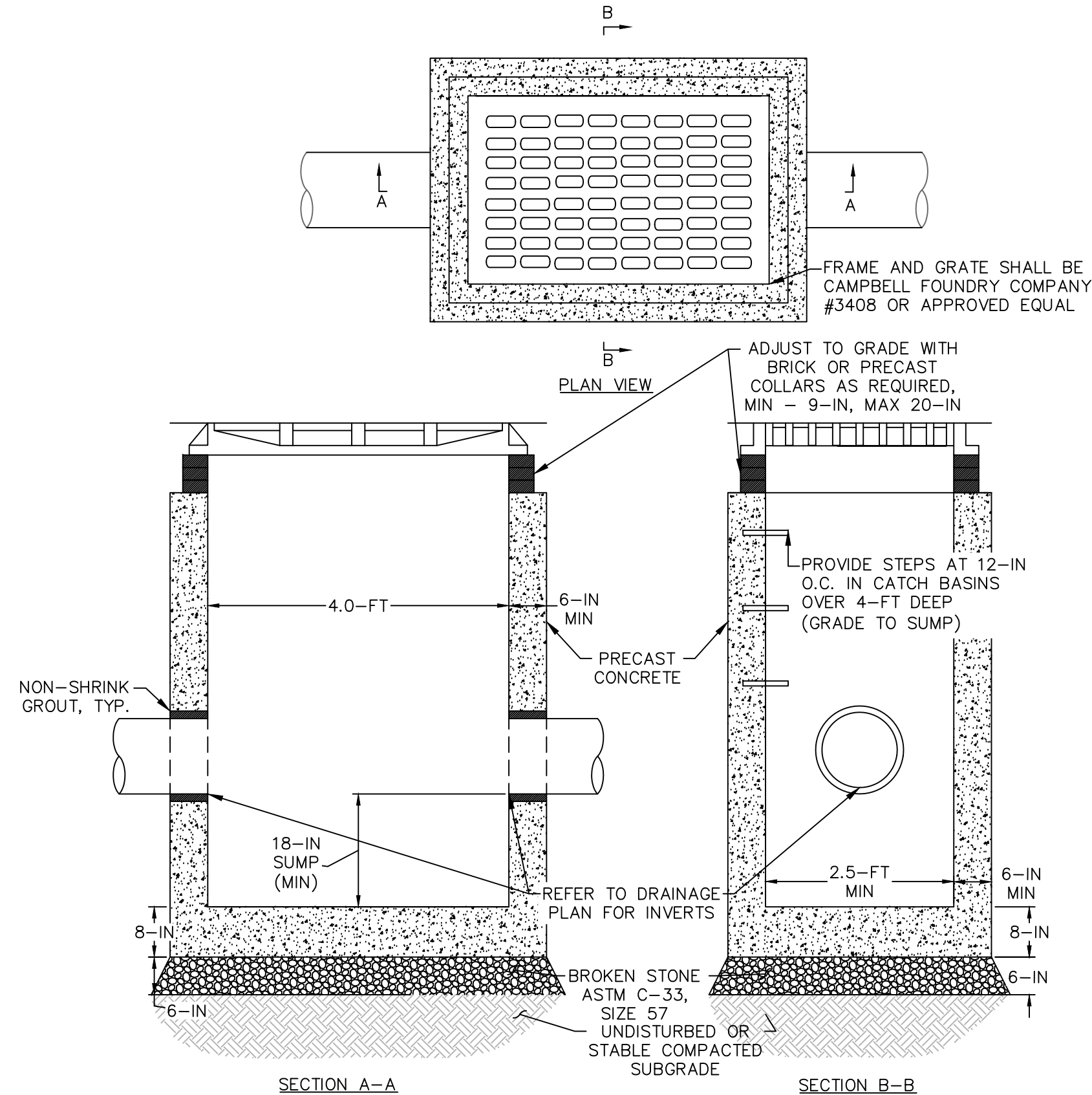
- NOTES:**
1. ALL MANHOLES SECTIONS SHALL CONFORM TO ASTM C-478, LATEST REVISION STANDARD SPECIFICATIONS FOR PRECAST REINFORCED MANHOLE SECTIONS.
 2. MANHOLE RISER SECTIONS TO BE FURNISHED IN 1, 2, 3 OR 4-FT HEIGHTS AS REQUIRED.
 3. PRECAST DRAINAGE STRUCTURES SHALL COMPLY WITH THE FOLLOWING:
 - A. CONCRETE STRENGTH: 4,000 PSI @ 28 DAYS
 - B. REINFORCING STEEL: ASTM A496-A615, GRADE 60 (F_y = 60,000 PSI)
 - C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
 - D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
 - E. INSTALLATION OF PRECAST CONCRETE DRAINAGE STRUCTURES SHALL COMPLY WITH ASTM C 891.
 4. FLAT SLAB TOPS (NO JOINT) MUST HAVE TOP AND BOTTOM STEEL.
 5. MANHOLE STEPS TO BE S.S. OR STEEL REINFORCED COPOLYMER POLYPROPYLENE.
 6. THE DEPTH OF THE CAST-IN-PLACE BENCH SHALL BE EQUAL TO 1/3 OF THE DIAMETER OF THE SEWER.
 7. THE BENCH SHALL SLOPE TOWARD THE INVERT CHANNEL AT A RATE OF 1" PER FOOT.
 8. PIPE CONNECTIONS SHALL BE GROUDED FIRMLY AND NEATLY IN PLACE WITH NON-SHRINK GROUT.
 9. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO INVERT EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

1 4-FT MANHOLE
NTS



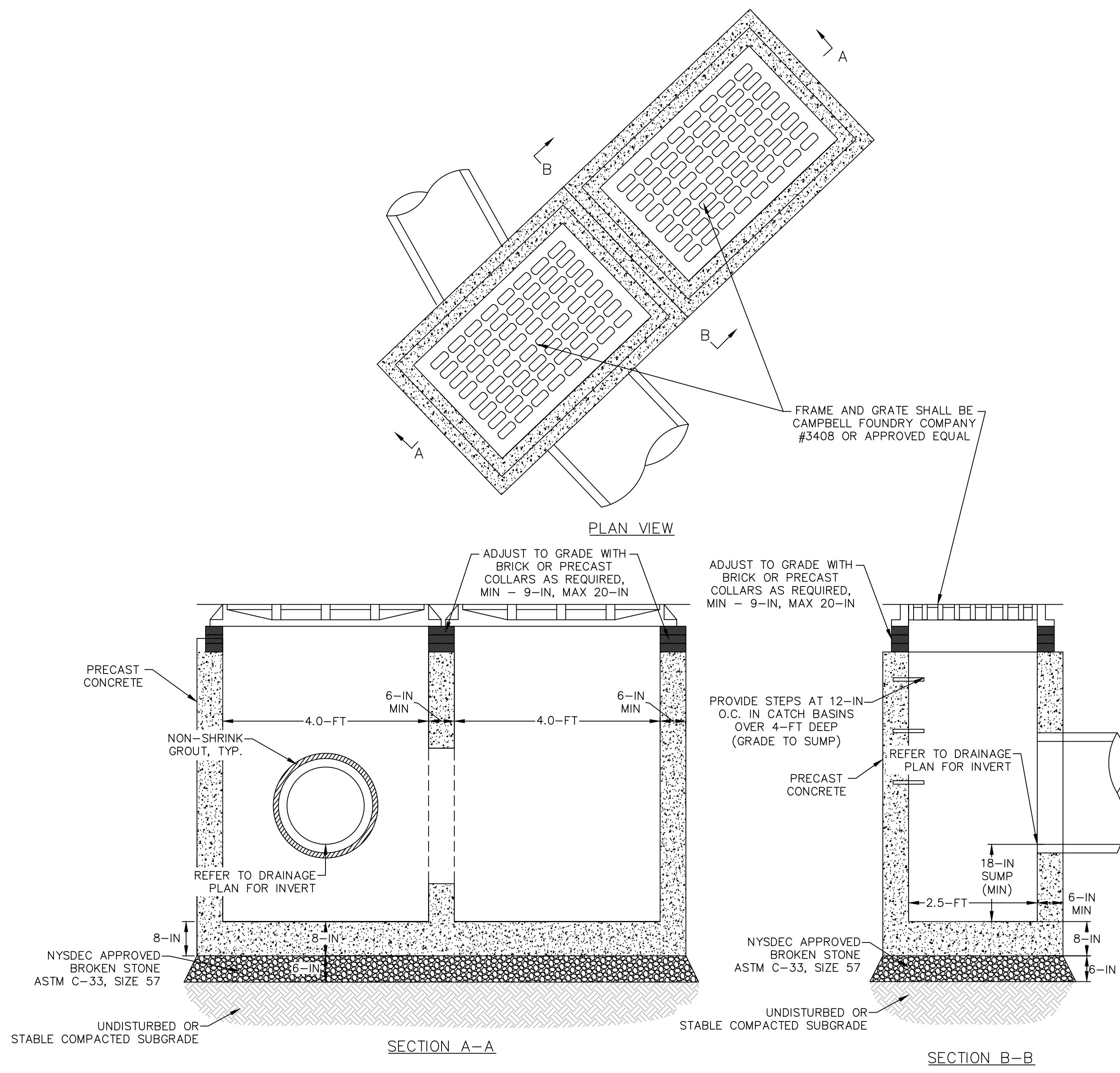
- NOTES:**
1. ALL MANHOLES SECTIONS SHALL CONFORM TO ASTM C-478, LATEST REVISION STANDARD SPECIFICATIONS FOR PRECAST REINFORCED MANHOLE SECTIONS.
 2. MANHOLE RISER SECTIONS TO BE FURNISHED IN 1, 2, 3 OR 4-FT HEIGHTS AS REQUIRED.
 3. PRECAST DRAINAGE STRUCTURES SHALL COMPLY WITH THE FOLLOWING:
 - A. CONCRETE STRENGTH: 4,000 PSI @ 28 DAYS
 - B. REINFORCING STEEL: ASTM A496-A615, GRADE 60 (F_y = 60,000 PSI)
 - C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
 - D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
 - E. INSTALLATION OF PRECAST CONCRETE DRAINAGE STRUCTURES SHALL COMPLY WITH ASTM C 891.
 4. FLAT SLAB TOPS (NO JOINT) MUST HAVE TOP AND BOTTOM STEEL.
 5. MANHOLE STEPS TO BE S.S. OR STEEL REINFORCED COPOLYMER POLYPROPYLENE.
 6. THE DEPTH OF THE CAST-IN-PLACE BENCH SHALL BE EQUAL TO 1/3 OF THE DIAMETER OF THE SEWER.
 7. THE BENCH SHALL SLOPE TOWARD THE INVERT CHANNEL AT A RATE OF 1" PER FOOT.
 8. PIPE CONNECTIONS SHALL BE GROUDED FIRMLY AND NEATLY IN PLACE WITH NON-SHRINK GROUT.
 9. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO INVERT EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

2 5-FT MANHOLE
NTS



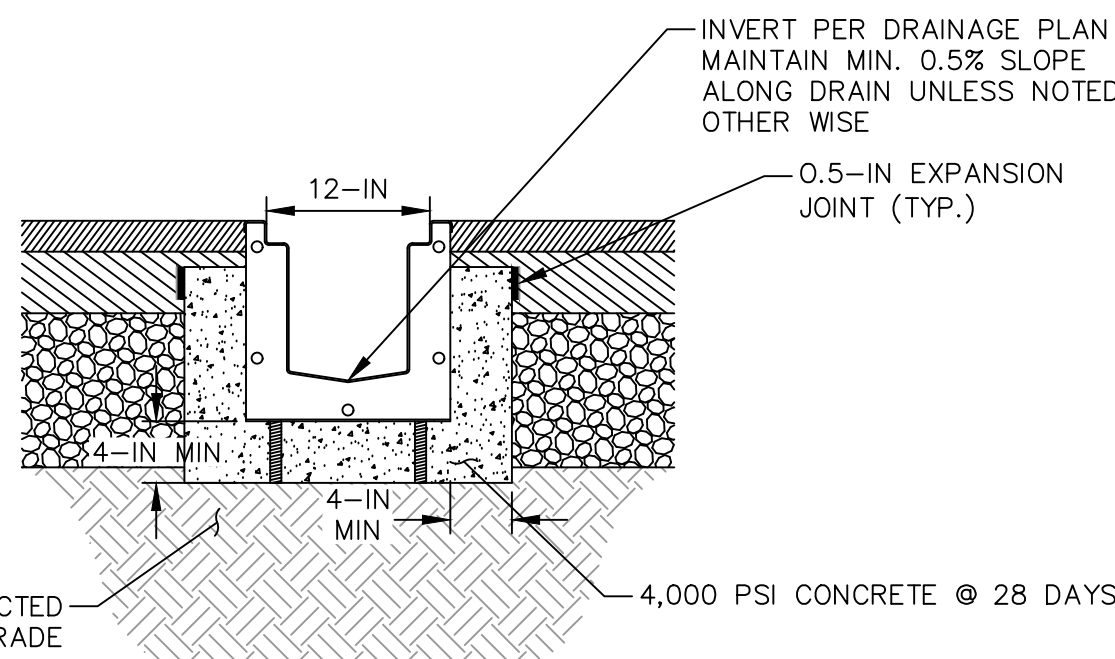
- NOTES:**
1. SOIL CONDITIONS AT BOTTOM OF EXCAVATION DEEMED UNSUITABLE BY FIELD ENGINEER SHALL BE EXCAVATED TO SUITABLE MATERIAL OR A MAXIMUM OF TWO ADDITIONAL FEET OF BEDDING MATERIAL.
 2. PRECAST DRAINAGE STRUCTURES SHALL COMPLY WITH THE FOLLOWING:
 - A. CONCRETE STRENGTH: 4,000 PSI @ 28 DAYS
 - B. REINFORCING STEEL: ASTM A496-A615, GRADE 60 (F_y = 60,000 PSI)
 - C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
 - D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
 - E. INSTALLATION OF PRECAST CONCRETE DRAINAGE STRUCTURES SHALL COMPLY WITH ASTM C 891.
 3. INTERIOR STRUCTURE DIMENSIONS SHOW ARE MINIMUM VALUES. PROVIDE DIMENSIONS AS NEEDED TO ACCOMMODATE 6-INCH CLEARANCE FROM SIDE WALLS OF BASIN TO OUTSIDE OF PIPE PENETRATION.
 4. ALL PIPE PENETRATIONS SHALL BE FLUSH WITH THE INSIDE WALLS OF THE CATCH BASIN. PIPE CONNECTIONS SHALL BE GROUDED FIRMLY AND NEATLY IN PLACE WITH NON-SHRINK GROUT.
 5. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO SUMP EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

4 SINGLE CATCH BASIN
NTS



- NOTES:**
1. SOIL CONDITIONS AT BOTTOM OF EXCAVATION DEEMED UNSUITABLE BY FIELD ENGINEER SHALL BE EXCAVATED TO SUITABLE MATERIAL OR A MAXIMUM OF TWO ADDITIONAL FEET OF BEDDING MATERIAL.
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 - A. CONCRETE STRENGTH: 4,000 PSI @ 28 DAYS
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 - C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
 - D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
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 3. INTERIOR STRUCTURE DIMENSIONS SHOW ARE MINIMUM VALUES. PROVIDE DIMENSIONS AS NEEDED TO ACCOMMODATE 6-INCH CLEARANCE FROM SIDE WALLS OF BASIN TO OUTSIDE OF PIPE PENETRATION.
 4. ALL PIPE PENETRATIONS SHALL BE FLUSH WITH THE INSIDE WALLS OF THE CATCH BASIN. PIPE CONNECTIONS SHALL BE GROUDED FIRMLY AND NEATLY IN PLACE WITH NON-SHRINK GROUT.
 5. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO SUMP EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

5 DOUBLE CATCH BASIN
NTS

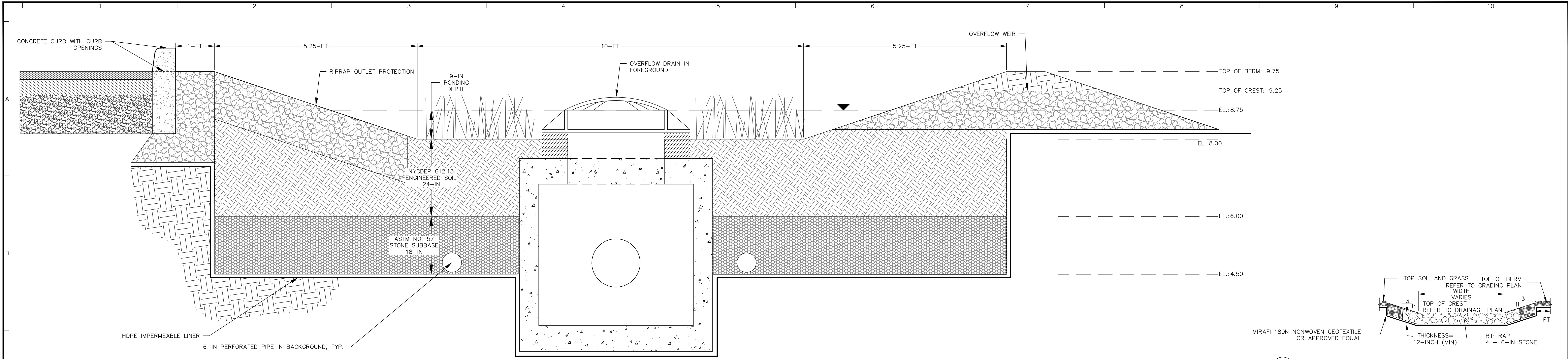


- NOTES:**
1. TRENCH DRAIN SHALL BE MODEL S300K MANUFACTURED WITH TYPE D END OUTLET (SK3-10) BY ACO DRAIN, OR APPROVED EQUAL.
 2. GRATE SHALL BE TYPE 8650/8660 PERFORATED STAINLESS STEEL GRATE LOAD CLASS C MANUFACTURED BY ACO DRAIN OR APPROVED EQUAL.
 3. TRENCH DRAIN DETAIL SHALL BE INSTALLED FOR TD-1, TD-2, & TD-3.

3 TRENCH DRAIN
NTS

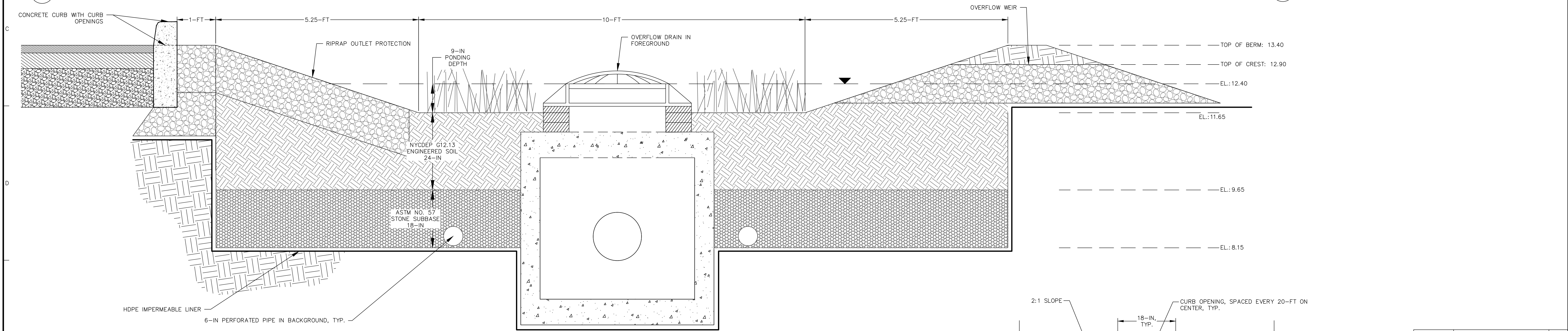
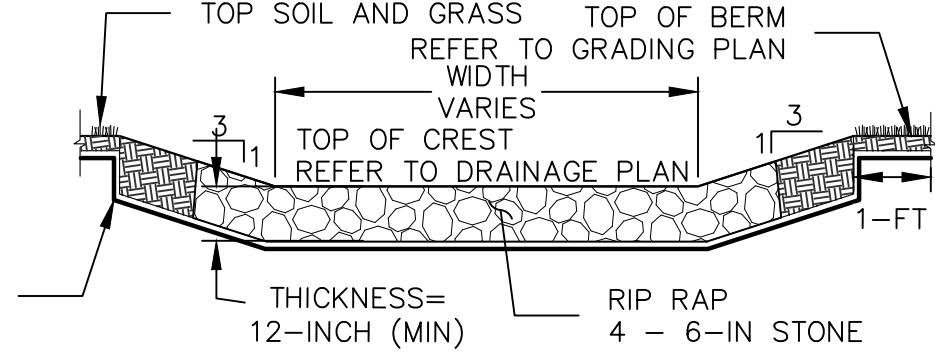
Date	Description	No.
REVISIONS		
SIGNATURE: PROFESSIONAL ENGINEER MICHAEL J. O'CONNOR DATE SIGNED: 02/12/2025 STATE LIC. No. 086302		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project		
CONEY ISLAND CREEK 2626 SHORE PARKWAY BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY		
Drawing Title		
STORMWATER STRUCTURE DETAILS		
B01177446-S1		
Project No.	Drawing No.	
170697301		
Date		
02/10/2025		
Drawn By		
MG		
Checked By		
BC		
Sheet		5 of 7
C-503		

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

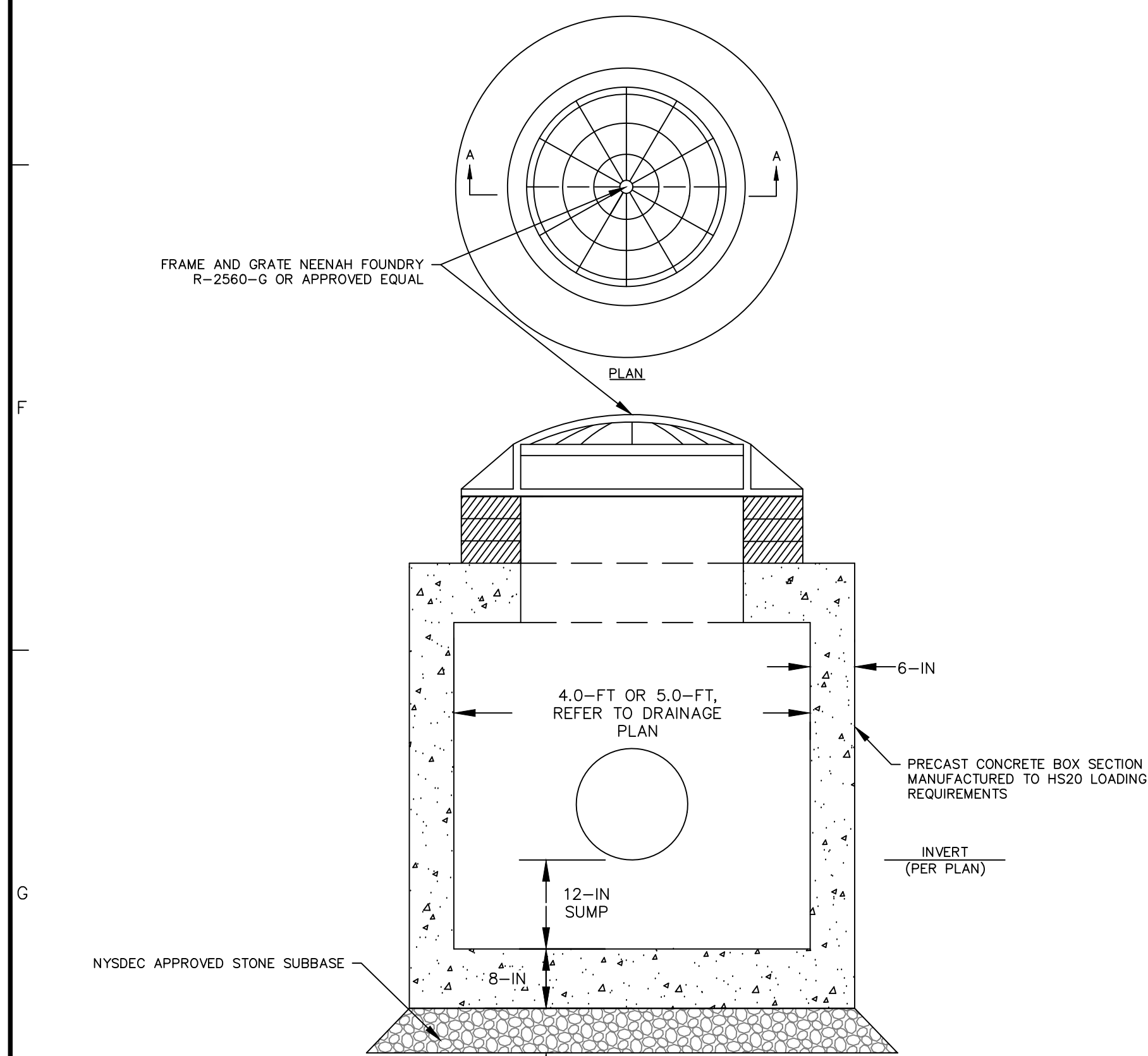


1 BIORETENTION SECTION A-A
NTS

3 OVERFLOW WEIR
NTS

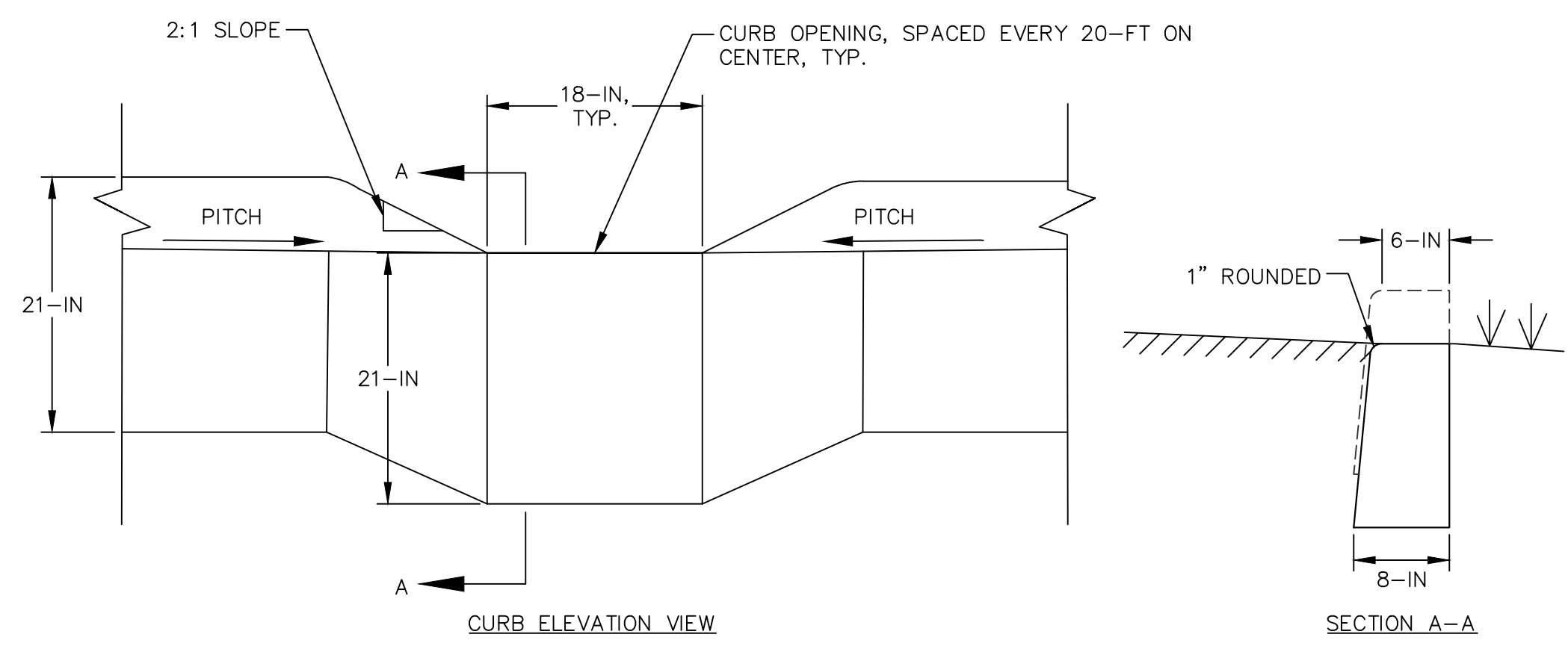


2 BIORETENTION SECTION B-B
NTS



5 BIORETENTION OVERFLOW DRAIN
NTS

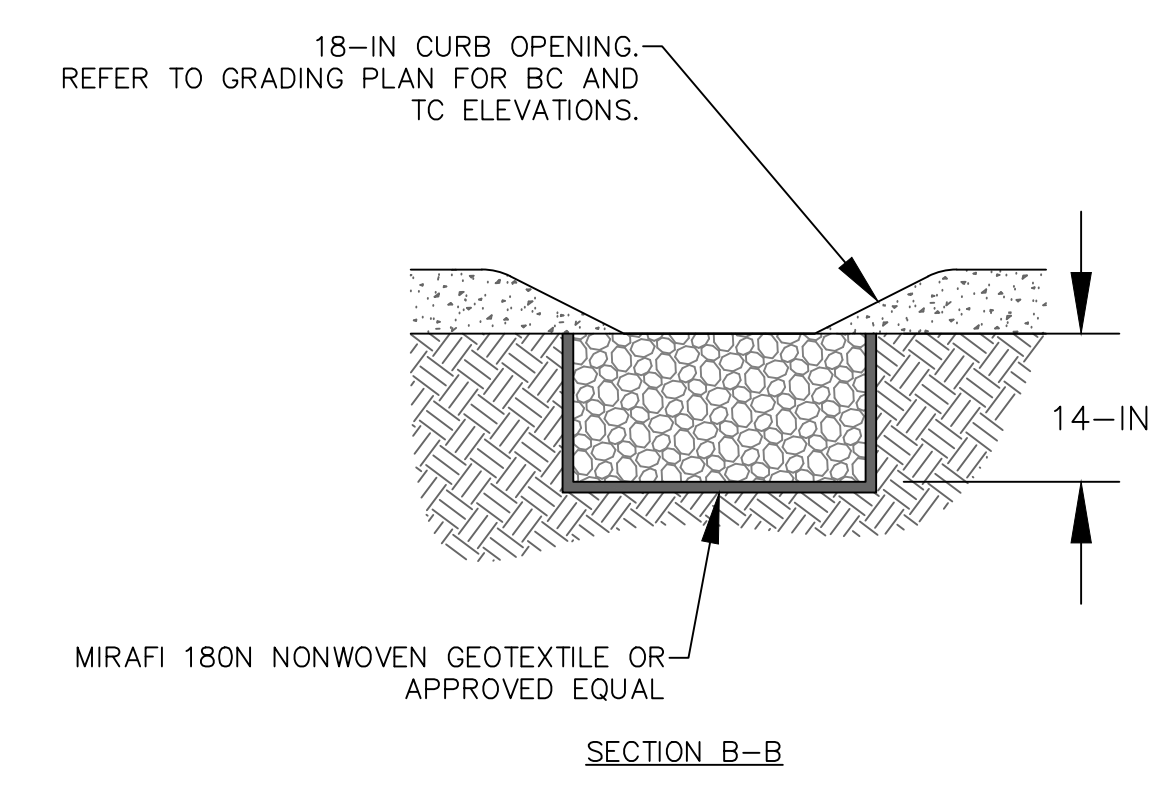
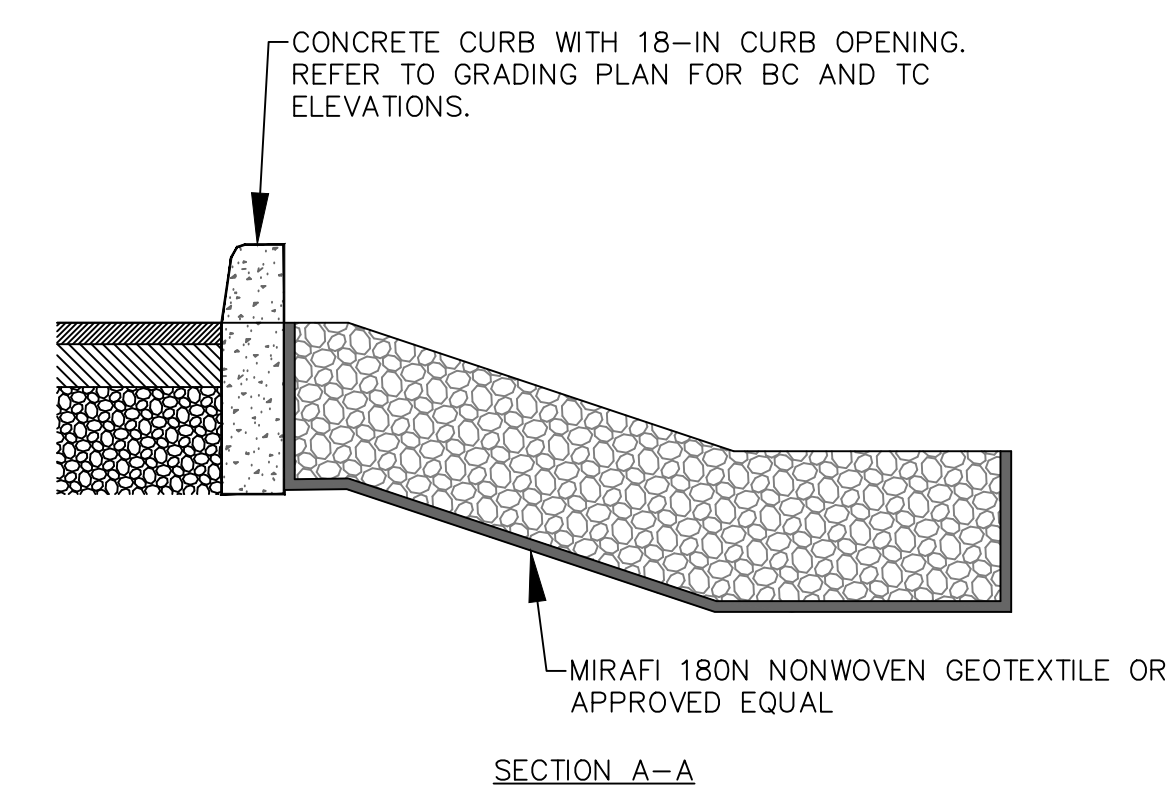
6 BIORETENTION RIPRAP OUTLET PROTECTION
NTS



NOTES:
1. CONCRETE STRENGTH SHALL BE 4,000 PSI AT A MINIMUM AT THE CONCLUSION OF THE 28 DAY TEST. AIR ENTRAINMENT SHALL BE 4% TO 7% AND SLUMP AT 3 INCHES MAXIMUM.
2. EXPOSED CONCRETE SURFACE IS TO BE RUBBED TO PROVIDE A SMOOTH FINISHED SURFACE.

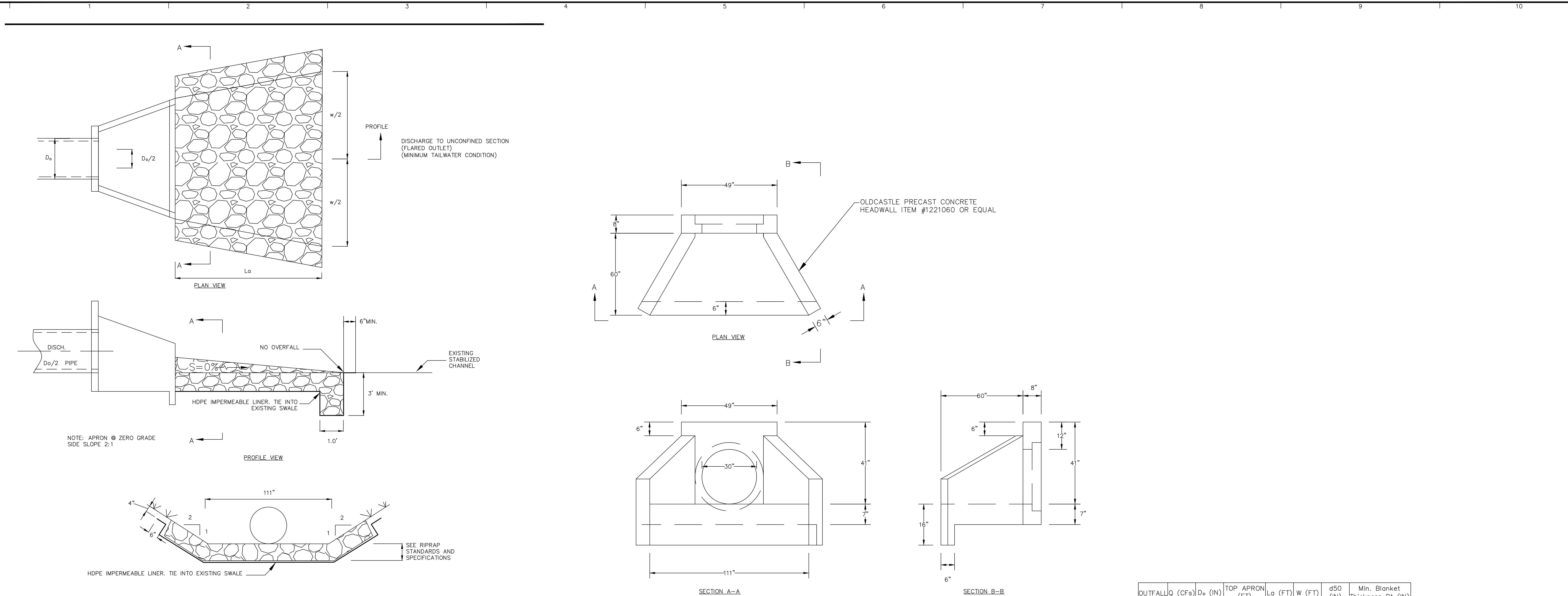
4 BIORETENTION CURB BREAK
NTS

STRUCTURE	Q (CFs)	D _o (IN)	TOP APRON (FT)	L _a (FT)	W (FT)	d50 (IN)	Min. Blanket Thickness Bt (IN)
CURB OPENING (MAX)	2.0	18	1.5	6	7.5	6	14



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Date	Description	No.
REVISIONS		
SIGNATURE: PROFESSIONAL ENGINEER MICHAEL E. O'CONNOR STATE LIC. No. 086302		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project: CONEY ISLAND CREEK 2626 SHORE PARKWAY BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY Drawing Title: STORMWATER STRUCTURE DETAILS		
B01177446-S1 Project No. 170697301 Date 02/10/2025 Drawn By MG Checked By BC		Drawing No. C-504 Sheet 6 of 7



- NOTES:
- CONTRACTOR TO PROVIDE SUBMITTAL FOR HDPE IMPERMEABLE LINER TO BE USED BENEATH RIPRAP OUTLET PROTECTION. SUBMITTAL IS SUBJECT TO REVIEW AND APPROVAL BY NATIONAL GRID AND NYSDEC.
 - SEE RIPRAP STANDARDS AND SPECIFICATIONS MINIMUM TAILWATER CONDITIONS
 - SEE FIGURE 3.44 OF NYS EROSION AND SEDIMENT CONTROL MANUAL

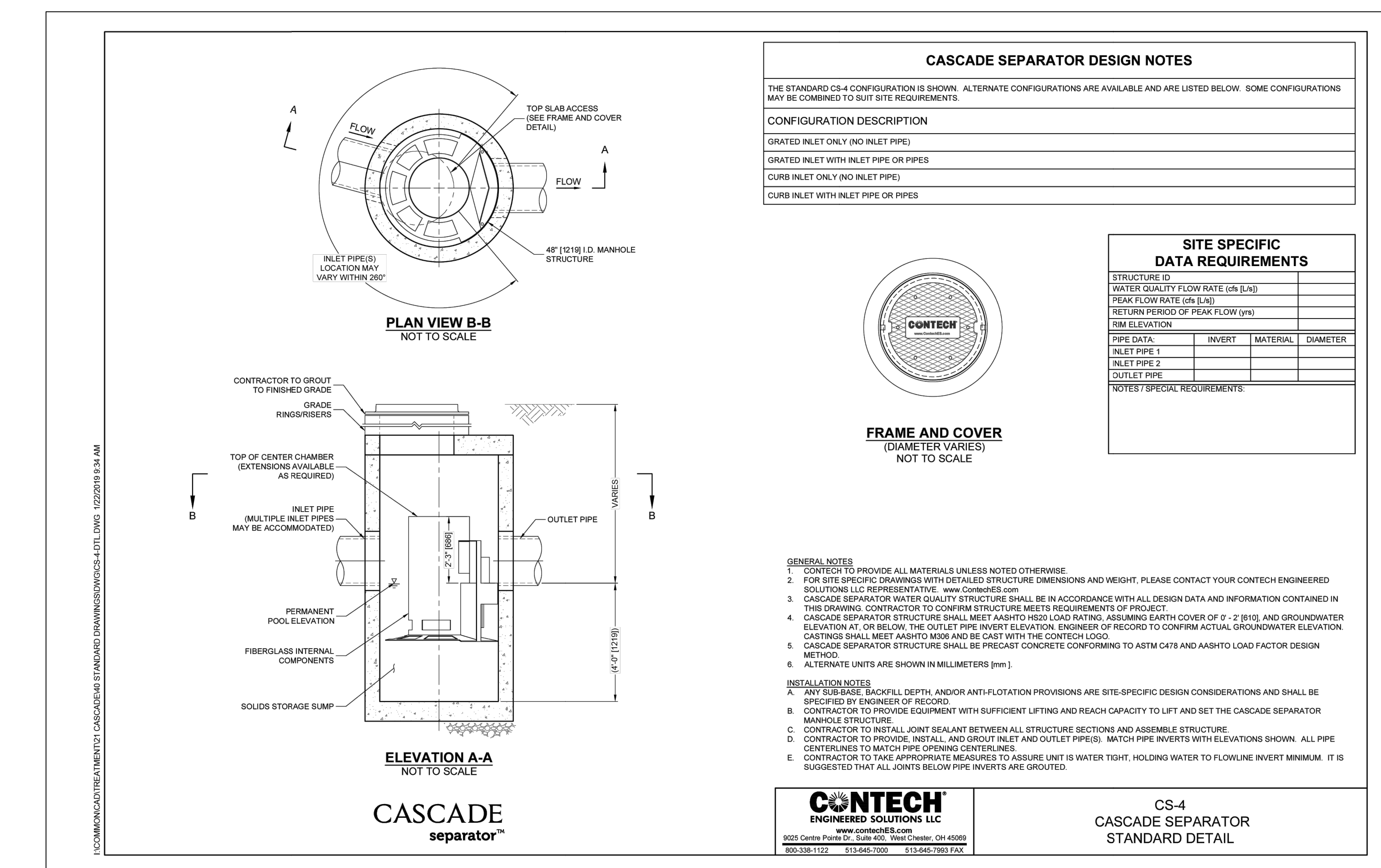
1 RIPRAP OUTLET PROTECTION
NTS

- NOTES:
- CONCRETE CLASS "C" WITH DESIGN STRENGTH OF 5000 PSI AT 28 DAYS.
 - STEEL REINFORCEMENT: ASTM A-615 GRADE 60 OR ASTM A-497 WELDED WIRE FABRIC.
 - DESIGN FOR HS20 LOADING.
 - ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".

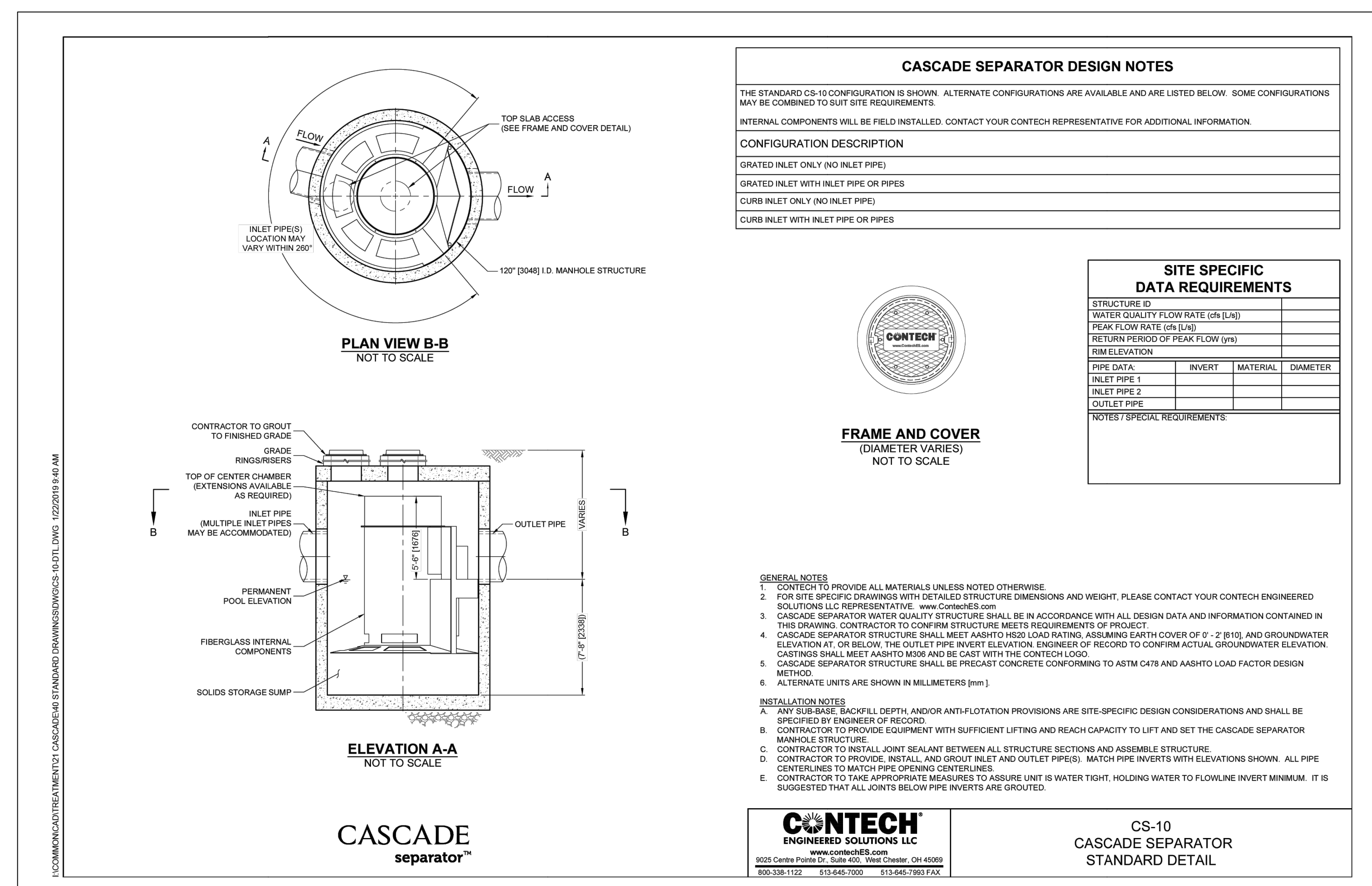
2 CONCRETE HEADWALL
NTS

3 PERMANENT RIPRAP OUTLET PROTECTION SCHEDULE - OUTFALLS
NTS

OUTFALL	Q (CFs)	D _o (IN)	TOP APRON (FT)	L _a (FT)	W (FT)	d50 (IN)	Min. Blanket Thickness Bt (IN)
1	36.8	30	9.25	16	18.5	6	14
2	29.1	30	9.25	16	18.5	6	14
3	41.1	30	9.25	19	21.5	9	20



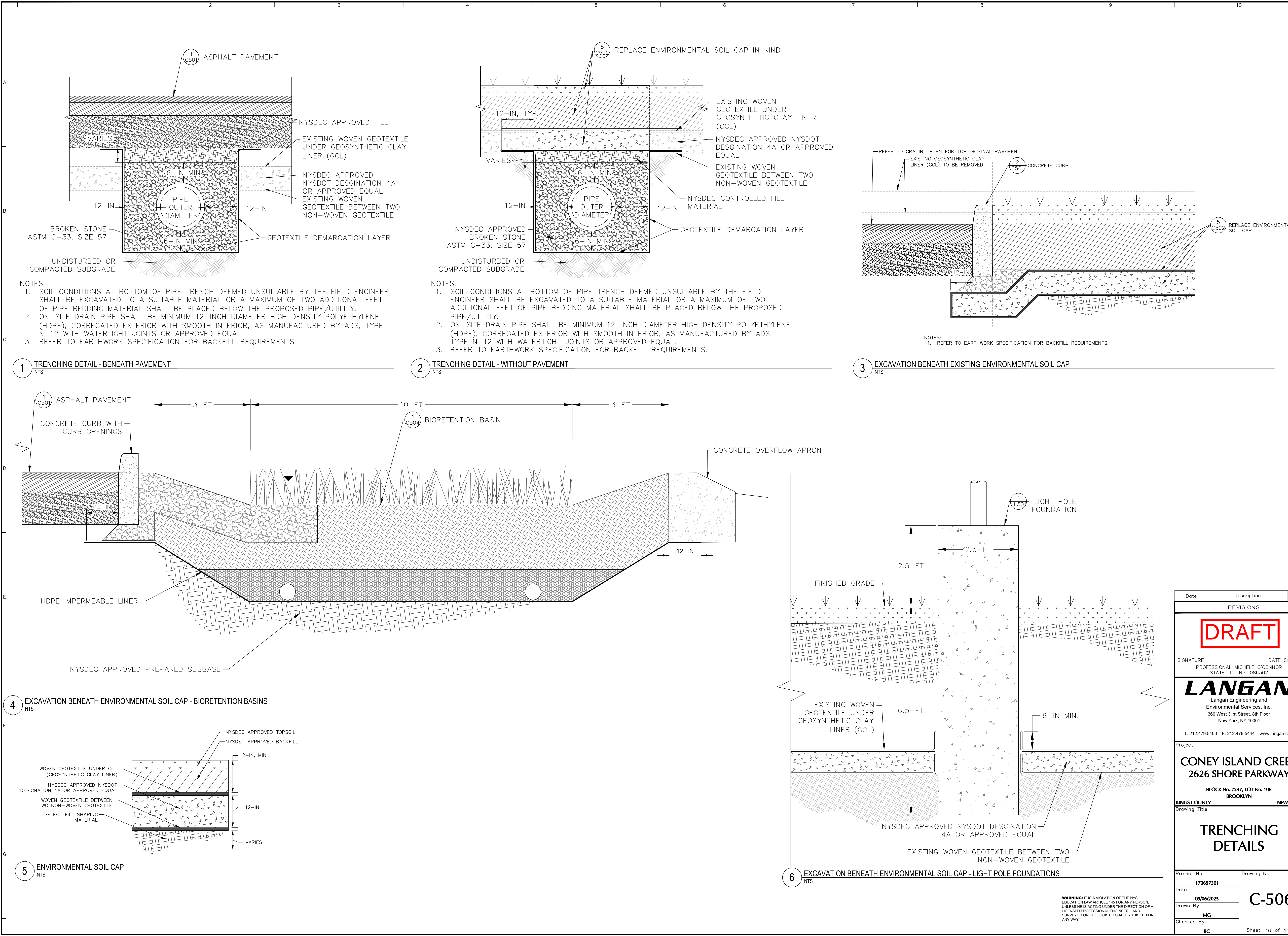
4 WATER QUALITY UNIT - CONTECH CS-4
NTS



5 WATER QUALITY UNIT - CONTECH CS-10
NTS

Date	Description	No.
REVISIONS		
SIGNATURE: PROFESSIONAL ENGINEER MICHAEL J. O'CONNOR DATE SIGNED: 02/12/2025 STATE LIC. No. 086302		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project: CONEY ISLAND CREEK 2626 SHORE PARKWAY BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY Drawing Title: STORMWATER STRUCTURE DETAILS		
B01177446-S1 Project No. 170697301 Date: 02/10/2025 Drawn By: MG Checked By: BC		Drawing No. C-505 Sheet 7 of 7

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Date	Description	No.
REVISIONS		
<div><div>DRAFT</div></div>		
SIGNATURE		DATE SIGNED
PROFESSIONAL MICHELE O'CONNOR		
STATE LIC. No. 086302		
<div><div>LANGAN</div><div>Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001</div><div>T: 212.479.5400 F: 212.479.5444 www.langan.com</div></div>		
Project		
CONEY ISLAND CREEK 2626 SHORE PARKWAY		
BLOCK No. 7247, LOT No. 106 BROOKLYN		
KINGS COUNTY		NEW YORK
Drawing Title		
TRENCHING DETAILS		
Project No.		Drawing No.
170697301		C-506
Date		
03/06/2025		
Drawn By		
MG		
Checked By		Sheet 16 of 15
BC		

ATTACHMENT 6
SWPPP AND NYSDEC NOI

STORMWATER POLLUTION PREVENTION PLAN

For

2731 West 12th Street
2731 WEST 12TH STREET, BROOKLYN, NY
BLOCK #7247, LOT 106

Prepared For:

Prologis
One Meadowlands Plaza, Suite 100
East Rutherford, NJ 07073

Prepared By:

**Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.**
21 Penn Plaza
368 Ninth Street, 8th Floor
New York, New York 10001



Michele O'Connor, PE
Professional Engineer NY License No. 086302

December 20, 2024
Project No.: 170697301

LANGAN

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C-001	Site Aerial Plan
C-002	Historic Photos Plan
C-003	FEMA FIRM Maps
C-004	Existing Drainage Areas
C-005	Post Development Drainage Areas
C-100	Erosion & Sediment Control Plan – Phase 1
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C-302	Drainage Plan
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C-402	Post Development Drainage Details
C-403	Post Development Drainage Details

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Appendix A	Water Quality Calculations
Appendix B	Operations and Maintenance (O&M) Manual for SMPs
Appendix C	Contech Specifications - Hydrodynamic Separator
Appendix D	USDA Soil Report
Appendix E	Subsurface Information (Excerpts from Geotechnical Engineering Report, prepared by Mueser Rutledge Consulting Engineers PLLC)
Appendix F	NYS DEC Details and Specifications
Appendix G	Pre-Construction Documents & Certifications
Appendix H	Construction Duration Inspections
Appendix I	Monthly Summary Reports
Appendix J	Contractor's Certifications and Forms
Appendix K	End of Construction Documents
Appendix L	Copy of SPDES General Permit
Appendix M	NYS DEC Notice of Intent (NOI) Form

PREFACE

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the construction of a fleet vehicle parking facility located at 2731 West 12th Street, Brooklyn, New York. A SWPPP is required for this site to comply with New York State Department of Environmental Conservation (NYS DEC) stormwater management design manual.

Design and Construction Stormwater Team

Owner/Developer

Prologis
One Meadowlands Plaza, Suite 100
East Rutherford, New Jersey 07073

Sheila Sutton
571-218-8739

SWPPP Preparer

Langan Engineering, Environmental, Surveying,
Landscape Architecture & Geology, D.P.C.
21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 10001

Michele O'Connor, PE
212-479-5439

SWPPP Implementation

The owner/developer and contractor are responsible for the proper implementation of all temporary and permanent stormwater pollution prevention measures proposed in this SWPPP.

This SWPPP shall be kept on-site and will be made available for review by the inspector, contractor, subcontractors, and applicable federal, state, and local regulatory agencies that have jurisdiction over the construction site. If necessary, any of these regulatory agencies may notify the owner or developer and contractor that the SWPPP is not in compliance with NYS DEC regulations.

SWPPP Amendments

The SWPPP preparer, owner, developer, or contractor shall amend this SWPPP to reflect any changes in design, construction, operation and maintenance of stormwater management practices associated with this SWPPP. Amendment of the SWPPP by the SWPPP preparer, owner, developer, or contractor may also be deemed necessary under the following conditions:

- Field conditions render the erosion and sediment control measures to be ineffective in minimizing pollutants from stormwater discharges.
- To identify a new contractor that will implement any measure of the SWPPP.

Revisions of the SWPPP shall be performed within 7 days of changes being identified. Minor amendments to the SWPPP must be marked up in a field book and maintained on site. Major amendments, such as changes to structural components that would require design review, must be filed with the regulatory agency.

EXISTING CONDITIONS



Figure 1 - Site Vicinity Map

Site Description

- Project/Site Name: 2731 West 12th Street
- Borough: Brooklyn
- Block and Lot: 7247 / 106
- Total Project Area: 730,989 SF (16.8 AC)
- Within MS4: No
- Site Vicinity: The site is bound to the North by the city owned Belt Parkway Access Road which is directly beneath the elevated Belt Parkway. The northeast of the site is bound NYCT infrastructure, and the remainder of the site is bound by the Coney Island Creek.

Existing Site Use

The site was a former National Grid Manufactured Gas Plant (MGP). The site was decommissioned, and remedial activities took place in 2003 and 2004. The site is now a vacant, mostly grass-covered lot that includes remnant concrete foundation elements; out-of-service electrical equipment associated with historical site operations; and drainage swales in the eastern, southern, and western parts of the site.

According to the November 2009 Final Engineering Report (FER) prepared by Paulus, Sokolowski and Sartor Engineering, PC (revised April 2013), the site is underlain by an about 3-foot-thick low-permeability multi-component environmental cap (LPMEC), which consists of at least 6 inches of topsoil underlain by 2 feet of imported soil and a geosynthetic clay liner, followed by fill to about 10 feet below grade surface (bgs). A sheet pile barrier wall system was also installed around the perimeter of the site as part of the implementation of remedial activities in 2003 and 2004 to keep contaminants from leaving the site.

Watershed and Drainage Conditions

The following are known existing watershed and drainage conditions for the site:

Table 1 – Watershed and Drainage Conditions

Fronting Sewers	There are no sewers fronting the project site
FEMA Flood Zone	Zone AE with BFE of 10 feet
Site Elevations	<ul style="list-style-type: none">• North Property Line – between about el. +8.40 and el. +10.75• South Property Line – between about el. -2.00 and el. -0.50• East Property Line – between about el. -1.00 and el. +1.20• West Property Line – between about el. -2.00 and el. +8.50

Runoff stays above the LPMEC and overland flows to one the Coney Island Creek or one of three existing swales that discharge to the Coney Island Creek on the southwest, south, and east of the site.

Soil Conditions

Existing soil conditions are based on a subsurface field investigation and laboratory testing consisting of eleven test borings. The subsurface conditions generally consist of fill, upper sand, organic clay, silt, and peat, and lower sand. Groundwater levels were measured and reported to be about Elev. +2.5 at the upland portion of the site and Elev. +1 near Coney Island Creek. Refer to the soil testing results and boring locations map obtained by Mueser Rutledge Engineers PLLC in Appendix E

The following table describes the strata encountered in borings during the subsurface investigation:

Table 3 – Soil Strata

Stratum	Description
Stratum F	Fill [Class 7]: Loose to compact brown, gray, and black, fine to coarse sand, some silt, some to trace gravel. The thickness of the fill layer is about 4.5 to 13.5 feet.
Stratum S1	Upper Sand [Class 3b]: Loose to compact gray and brown fine to coarse sand, trace silt to silty, trace gravel. The thickness of the upper sand layer is 4 to 9.5 feet.
Stratum O	Organic Clay, Silt, and Peat [Class 7]: Black organic clay, silty to some silt, with peat or roots, trace to some fine to medium sand, trace gravel or gray silt to silty fine to medium sand, some to trace peat or roots, trace to some clay. The thickness of the upper sand layer is 2 to 10 feet.
Stratum S2	Sand [Class 3b]: Loose to medium compact, gray, dark gray, and brown fine to coarse sand, some to trace silt, trace to some gravel. The depth of this stratum varies from 7 to 24.5 feet below grade

Stratum M	Clayey Silt [Class 6]: Gray clayey silt layer within Stratum S2. N values recorded in this stratum are 5 and 9. The depth of Stratum M is 8-ft thick
-----------	--

According to the USDA NRCS National Cooperative Soil Survey report (refer to Appendix D), the site is classified as the following:

- Hydrological Soil Group (HSG): Unranked
- Soil classifications: 100% Oi—Oil-waste land

PROPOSED CONDITIONS

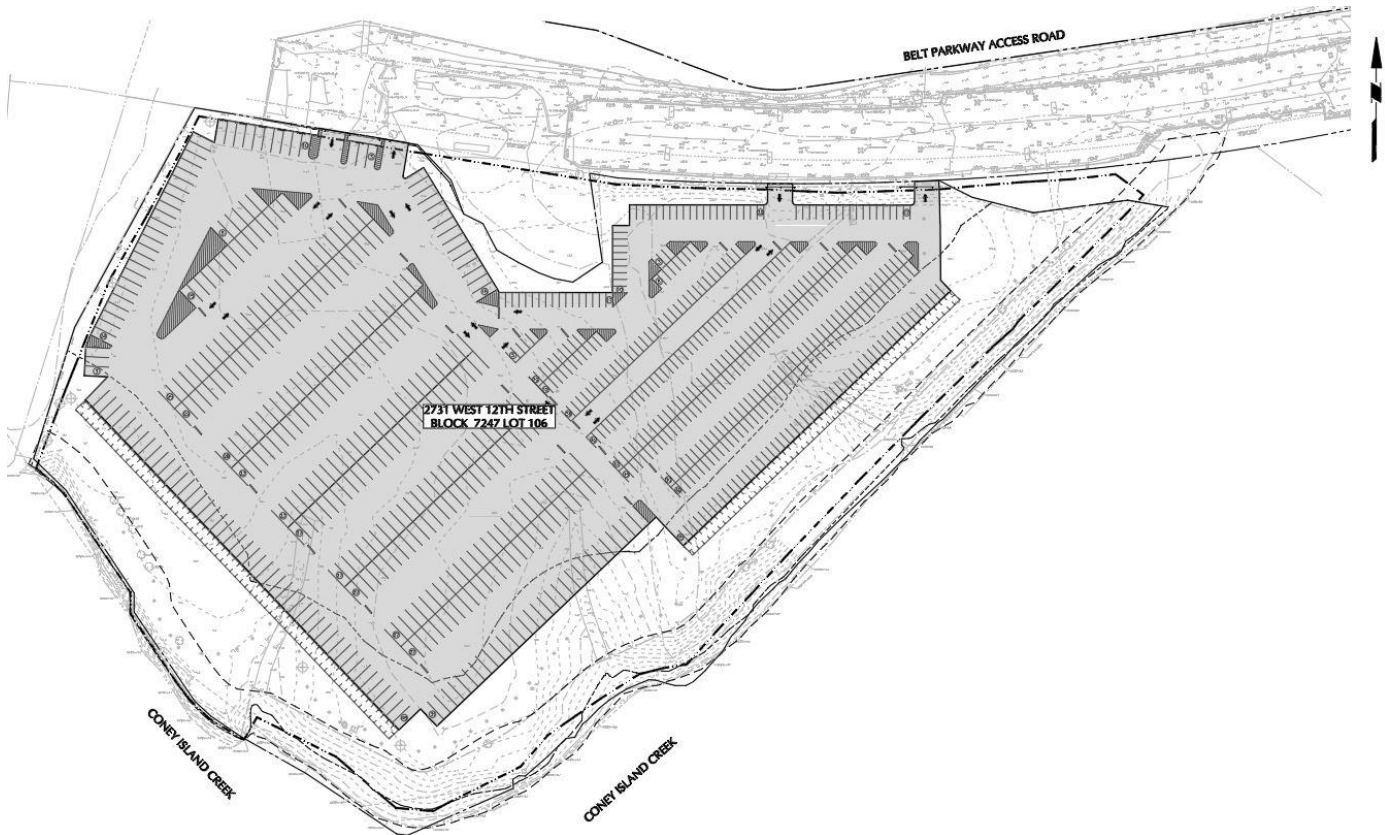


Figure 2 - Project Area Site Plan

Project Description

- Total Area to be Disturbed: 573,900 SF (13.2 AC)
- Existing Impervious Area to be Disturbed: 0 SF (0.00 AC)

-
- Proposed Impervious Area within the Disturbed Area: 466,115 SF (10.7 AC)
 - Proposed Land Use: Commercial
 - Proposed Development: Vehicle Fleet Parking Facility
 - Stormwater Management Practices (SMPs): Hydrodynamic Separator Unit, Bioretention
 - Estimated Construction Duration: April 2025 – December 2025

Proposed Site Management Plan

As documented in the FER, the remediation site is subject to ongoing environmental requirements outlined in an Environmental Notice, Site Management Plan, and Excavation Work Plan (EWP) due to remaining MGP-related impacts in soil, sediment, and groundwater. The redevelopment project will result in disturbance of the previously constructed LPMEC (engineered cap), and underlying impacted material within an approximately 466,115-square-foot portion of the site. All work that will result in disturbance of the LPMEC and underlying impacted material will be completed in accordance with the New York State Department of Environmental Conservation (NYSDEC)-approved 10 June 2019 Site Management Plan, Revision No. 4, and its appended EWP, and the forthcoming NYSDEC-approved Notice of Intrusive Activity (NOIA) letter.

The redevelopment project will include regrading the engineered cap and underlying impacted fill to achieve development grade; excavation and trenching for the installation of sub-grade drainage infrastructure, utilities, and foundation elements; off-site disposal of disturbed impacted soil/fill; restoration of the engineered cap; and import of soil/fill in accordance with the sampling and analytical requirements of the Site Management Plan, EWP, and Quality Assurance Project Plan for engineered cap restoration. In areas of proposed pavement, the asphalt pavement will serve as the impermeable soil cap.

While the export of significant quantities of impacted fill is not anticipated, some off-site disposal is anticipated and will be performed in compliance with the requirements of the Site Management Plan, EWP and the forthcoming NYSDEC-approved NOIA. All excavated material that will not be placed as backfill under the engineered cap or alternative cover system will be stockpiled, characterized in accordance with disposal facility requirements, and disposed of off-site at a National Grid- and NYSDEC-approved facility permitted to accept the material in accordance with

the EWP. All material will be handled in accordance with the SMP, EWP, and the forthcoming NYSDEC-approved NOIA.

EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

NYS DEC requires the implementation of protective measures to minimize the impacts from construction activities involving soil disturbance. Temporary soil erosion and sediment control measures will be applied to this site to minimize the amount of sediment carried by stormwater runoff during construction activities. Temporary structural and vegetative measures have been designed in accordance with the NYS DEC Standards and Specifications for Erosion and Sediment Control (latest edition). The following summarizes the planned soil erosion and sediment control practices as shown on Drawing C-100 and Drawing C-101 enclosed herein.

The following sections provide general guidance to the proper soil erosion and sediment control measures for various aspects of construction. It is the responsibility of the contractor to use the Contract Drawings, this SWPPP, and observed site conditions to develop project-specific erosion and sediment control plans.

General Erosion and Sediment Control Practices

- **Dust Control:** Excessive dust shall be monitored and controlled in accordance with the NYSDOH Community Air Monitoring Program (CAMP). If airborne dust is observed leaving the work area, dust suppression will be employed. Dust suppression can be achieved through the use of a dedicated water distribution system, on-site water truck for road wetting, or an alternate source with suitable supply and pressure for use in dust control. Gravel will be used for on-site roads to provide clean and dust-free road surface. Refer to NYS DEC Blue Book Section 2.25 for specifications.
- **Silt Fence:** A silt fence may be installed along down-gradient areas of the site perimeter to prevent any sediment laden runoff from discharging to the adjacent streets and NYC DEP storm sewers. The proposed location of the silt fence is shown on C-100 and C-101. Refer to NYS DEC Blue Book Section 5.54 for specifications.
- **Stabilized Construction Entrances:** The locations of the stabilized construction entrances will be determined by the contractor. Potential locations for the construction entrances are

shown on C-100 and C-101. Wash-down water and runoff from the construction entrances shall be directed to the appropriate soil erosion and sediment control measures. Stabilized Construction Entrances shall be clean crushed angular stone, ASTM C-33 size No. 1 or 2. Refer to NYS DEC Blue Book Section 2.30 for specifications.

- Temporary Crushed Virgin Stone: Temporarily place crushed virgin stone on exposed rough-graded soil areas that will be left exposed for more than fourteen days, and not subject to construction traffic. Refer to section "Temporary Stabilization" for specifications for temporary placement of crushed stone.
- Temporary Seeding: Temporarily seed exposed rough-graded soil areas that will be left exposed for more than fourteen days, and not subject to construction traffic. Refer to section "Temporary Stabilization" for specifications for temporary seeding. Refer to NYS DEC Blue Book Section 4.58 for specifications.
- Inlet Protection: Inlet protection shall be installed at all stormwater inlets receiving runoff from disturbed areas of the site. The proposed locations of inlet protection are shown on C-101. Refer to NYS DEC Blue Book Section 5.57 for specifications.
- Concrete Truck Washout Facility: The locations of the concrete truck washout facilities will be determined by the contractor. Potential locations for the concrete truck washout facilities are shown on C-100 and C-101; however, the contractor may relocate as necessary to facilitate the work, and document the relocation within the SWPPP folder on-site. Contractor will be responsible for sizing the washout facility based on the expected quantity of trucks (chutes and hoppers). Refer to NYS DEC Blue Book Section 2.24 for specifications.
- Staging & Equipment Storage Areas: Provide standard soil erosion and sediment control measures to all areas used for equipment staging and storage. The objective of these measures shall be to prevent any off-site sediment tracking due to equipment, loading of trucks or other vehicles, etc.
- Stockpile Protection: The locations of the soil stockpiles will be determined by the contractor. Potential locations for the soil stockpiles are shown on C-100 and C-101. All soil stockpiles shall be limited in size to about 1,000 cubic yards and be covered with 6-mil plastic sheeting or tarp at the end of each work day. Stone stockpiles do not require any erosion and sediment controls.

- **Turbidity Curtain:** Turbidity curtain shall be located beyond the lateral limits of the construction site and firmly anchored in place. The alignment should be set as close to the work area as possible but not so close as to be disturbed by applicable construction equipment. Refer to NYS DEC Blue Book Section 5.65 for additional specifications.
- **Tree Protection:** If the construction area is within the dripline of any existing tree to remain, temporary tree protection shall be installed to protect the tree from mechanical injury during construction in accordance with NYC DPR standards and specifications. Refer to NYS DEC Blue Book Section 2.26 for additional specifications.

Temporary Stabilization

The contractor shall initiate surface stabilization measures as soon as practical in those portions of the site where construction activities have temporarily or permanently ceased. The application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The following measures for temporary stabilization may be used:

Crushed Virgin Stone

For temporary placement of crushed virgin stone:

- Cover disturbed area with a minimum 4-inch layer of 3/4-inch to 1-inch crushed virgin stone.

Maintenance:

- The contractor may be directed to patch any areas which, in the opinion of the Qualified Inspector, are unacceptable.
- The contractor shall maintain the stone cover and install new stone as needed if soil becomes exposed.

Vegetative Plan

For temporary seeding and mulch:

- **Type of seed:**
 - During Growing Season (Spring, Summer, or Early Fall): seed the area with ryegrass at 30 lbs per acre (approximately 0.7lbs / 1,000sf).

- During Late Fall/Early Winter: seed with Certified “Aroostook” winter rye at 100 lbs per acre (2.5 lbs/1,000 sf)
- Broadcast seed at the manufacturer’s recommended rate with a cyclone seeder, drop spreader, or cultipacker seeder.
- Rake seed into the soil and lightly pack to establish good contact.
- Mulch the seeded area with hay or straw at 2 tons per acre (approximately 90 lbs/1,000 sf). Mulch anchoring is to be used in areas where wind or water erosion are a concern. Nylon or synthetic anchoring products are not to be used.

Maintenance:

- The contractor may be directed to reseed any areas which, in the opinion of the Qualified Inspector are unacceptable.
- The contractor shall adequately maintain the erosion control cover, including watering as necessary.
- If the growth is inadequate for erosion control, the contractor shall overseed using half the rate of seed originally applied.
- If the grass seed growth is over 60% damaged, reseed following the originally specified rate.

Construction Sequencing

Below is the general sequence of construction and appropriate soil erosion and sediment control practices tied to each phase. All soil erosion and sediment control practices shall be constructed in accordance with the latest edition of New York State guidelines for soil erosion and sediment control. The construction phases are as follows:

1. **Phase 1 – Earthwork, Installation of Site Management Plan, and On-Site Utility Installation:** This phase includes the excavation and the installation of the environmental site management plan. Construction activities consist of site excavation, on-site utility installation, grading, and installation of the Site Management Plan. A support of excavation system will be installed along the site perimeter. During this phase, there is no potential for stormwater runoff due to the site being lower in elevation than the surrounding area. At the end of this phase, the site will be stabilized by a concrete building foundation slab.

2. **Phase 2 – Hardscaping and SMP Installation:** This phase includes the hardscaping of the parking facility and installation of the final stormwater management practices. At the end of this phase, the site will be stabilized by the site pavements and bioretention basins

Table 4 – Construction Phasing and Sequence Plan: Phase 1 – Earthwork, Installation of Site Management Plan, and On-Site Utility Installation

Phase 1 – Earthwork, Installation of Site Management Plan, and On-Site Utility Installation			
Activity (In order of construction)	Erosion and Sediment Control Practice	When will Practice Be Installed?	Maintenance, Replacement, and Removal of ESCs
Mobilization	a. Stabilized Construction Entrance (SCE) b. Silt Fence c. Turbidity Curtain	a. All shall be installed during site preparation and prior to construction activities	a. SCE maintained in a condition that prevents tracking of sediment onto ROWs b. SCE removed following completion of building foundation c. Silt fence and turbidity maintained in a condition that prevents sediment laden runoff from discharging to the Coney Island Creek
Earthwork, Installation of Site Management Plan, and On-Site Utility Installation	a. SCE b. Soil Stockpile Protection c. Dust Control d. Concrete Truck Washout Facility e. Silt Fence f. Turbidity Curtain g. Tree Protection	a. SCE installed during mobilization b. Soil stockpile protection installed as needed during material excavation and import activities c. Dust control will be implemented during activities causing excessive dust d. Concrete truck washout facility installed prior to start of concrete work e. Silt fence, turbidity curtain installed during mobilization	a. SCE maintained in a condition that prevents tracking of sediment onto ROWs b. SCE removed following completion of building foundation c. Soil stockpile protection maintained at the end of each work day d. Soil stockpile protection removed when stockpiles are removed/used e. Dust will be controlled f. Concrete washout facility maintained during concrete work activities g. Concrete washout facility removed when concrete work is complete

			h. Silt fence and turbidity maintained in a condition that prevents sediment laden runoff from discharging to the Coney Island Creek
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Table 5 – Construction Phasing and Sequence Plan: Phase 2 – Hardscaping and SMP Installation

Phase 2 – Hardscaping and SMP Installation			
Activity (In order of construction)	Erosion and Sediment Control Practice	When will Practice Be Installed?	Maintenance, Replacement, and Removal of ESCs
Hardscaping	a. SCE b. Soil Stockpile Protection c. Dust Control d. Concrete Truck Washout Facility e. Silt Fence f. Turbidity Curtain g. Tree Protection	a. SCE installed during mobilization b. Soil stockpile protection installed as needed during material excavation and import activities c. Dust control will be implemented during activities causing excessive dust d. Concrete truck washout facility installed prior to start of concrete work e. Silt fence, turbidity curtain installed during mobilization	a. SCE maintained in a condition that prevents tracking of sediment onto ROWs b. SCE removed following completion of building foundation c. Soil stockpile protection maintained at the end of each work day d. Soil stockpile protection removed when stockpiles are removed/used e. Dust will be controlled f. Concrete washout facility maintained during concrete work activities g. Concrete washout facility removed when concrete work is complete h. Silt fence and turbidity maintained in a condition that prevents sediment laden runoff from

Installation of SMPs	N/A	N/A	There will be no on-site erosion and sediment control practices during installation of SMPs.
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Allowable Non-Stormwater Discharges

The following table summarizes allowable non-stormwater discharges likely to be present at the project site during construction. This SWPPP is designed to convey all non-stormwater discharges to on-site control measures, away from public streets or adjacent water bodies. Turbid water is to be detained to allow sufficient sedimentation time (minimum of 24 hours).

Table 6 – Allowable Non-Stormwater Discharges During Construction

Type of Authorized Non-Stormwater Discharge	Likely to be Present at Your Site?
Landscape irrigation	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Waters used to wash vehicles and equipment (cleansers are not used)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Water used to control dust (no chemical additives)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Potable water including uncontaminated water line flushing	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
External building wash down (soaps/solvents are not used, and external surfaces do not contain hazardous substances)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Pavement wash waters (spills or leaks have not occurred)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Uncontaminated air conditioning or compressor condensate*	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Uncontaminated, non-turbid discharges of ground water or spring water*	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Foundation or footing drains*	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Discharges from construction de-watering operations*	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

*Require permits from DEP's Bureau of Water and Sewer Operations, DEP's Bureau of Waste Water Treatment, Department of Buildings and/or NYSDEC.

Dewatering

If required, dewatering activities for the project site will be performed under a NYC DEP dewatering permit obtained by the contractor. The contractor shall be responsible for maintaining

the existing permit. The temporary dewatering system will be maintained and operated in accordance with manufacturer recommendations and the Operation and Maintenance Manual.

Inventory for Pollution Prevention Plan

The contractor is responsible for maintaining a log book of all pollutant generating activities. The log book shall be kept in the trailer at all times. A template for materials maintained on-site are included in Appendix J. The list will include potential pollutants and where they will be stored on-site. This can include but are not limited to:

- Asphalt
- Bituminous concrete products
- Concrete and concrete products
- Diesel and gasoline fuels
- Paints
- Plastics
- Silicon (sealants)
- Steel
- Wood

Spill Prevention

The following are material management practices that are to be used by the contractor to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff during construction.

- Materials stored on-site with potential for spillage are to be stored in a neat and orderly manner in their appropriate containers. Materials with a potential for spillage shall be stored under a roof or other enclosure when possible.
- Products are to be kept in their original containers with the original manufacturer's label.
- Substances are not to be mixed with one another unless recommended by the manufacturer.
- Prior to disposal, a product is to be completely used up or its container is to be resealed whenever possible.
- Manufacturers' recommendations for proper use and disposal are to be followed.

- During periodic inspections, the proper use and disposal of materials is to be recorded on the inspection form.
- On-site vehicles are to be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage of petroleum products. Petroleum products are to be stored in closed containers that are clearly labeled. Used oils are to be disposed of properly.
- Materials are to be brought on-site in the minimum quantities required to limit on-site storage.
- Paint containers are to be tightly sealed and properly stored when not required for use. Excess paint, solvents, and other similar products shall not be discharged to the storm sewer system. These items are to be properly disposed of according to manufacturers' instructions or state and local regulations.
- Proper precautions are to be taken so materials do not spill onto public thoroughfares. If materials are spilled in these areas they are to be removed immediately so that they do not enter the surface and subsurface drainage systems.
- Oil containers are to have appropriate secondary containment. If total oil storage on-site exceeds a cumulative total of 1,320 gallons, then a Spill Prevention Control and Countermeasure (SPCC) plan must be prepared by the owner or contractor.
- If necessary, the owner or contractor is to prepare a SPCC plan to cover proposed activities.

Spill Control Practices

The following practices are to be adhered to by the contractor for spill prevention and cleanup:

- Spills of petroleum, toxins, or hazardous material are to be reported to the owner and appropriate state or local government agencies immediately, regardless of size.
- Manufacturers' recommended methods for spill cleanup are to be clearly posted at the site. Site personnel are to be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup are to be kept in designated material storage areas on-site. Equipment and materials are to include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, spill control materials, sand, sawdust, and trash containers specifically for this purpose.

- Spills are to be cleaned up immediately after discovery.
- The spill area is to be kept well ventilated and personnel are to wear appropriate protective clothing to prevent injury from contact with hazardous substances.
- A spill report is to be completed and filed in the SWPPP and is to include a description of the spill, the cause of the spill, and the corrective actions taken.
- At minimum, all spills of petroleum products of 5 or more gallons shall be reported to NYSDEC Spill Hotline at 1-800-457-7362.

Additional Stormwater Controls

The following is a description of additional controls and measures that are to be implemented at the site by the contractor to minimize pollutant transport.

- Solid waste disposal dumpsters and containers are to be covered and emptied regularly. Solid waste is to be disposed of properly in accordance with local regulations.
- Portable toilets are to be installed and cleaned regularly with their contents properly disposed of.
- Building materials are to be properly stored and contained on-site.

INSPECTION DURING CONSTRUCTION

A Qualified Inspector (QI) shall conduct an assessment of the site prior to the commencement of construction. The SPDES General Permit for Construction Activity GP-0-20-001 outlines the following requirements and guidelines for inspections during construction:

The owner or operator shall have a qualified professional conduct a site inspection at least once every seven calendar days. In order to be authorized to disturb greater than five (5) acres of soil at any one time the owner or operator shall have a qualified professional conduct at least two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days., for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. At a minimum, the qualified professional shall inspect all soil erosion and sediment

control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved final stabilization, and all points of discharge from the construction site.

The QI shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

1. Date and time of inspection;
2. Name and title of person(s) performing inspection;
3. A description of the weather and soil conditions (i.e. dry, wet, saturated) at the time of inspection;
4. Reason for inspection (i.e. once weekly, twice weekly, 30-day inspection, inspection after rainfall, etc.);
5. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
6. The approximate stage of construction (i.e. percent complete);
7. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;
8. Identification of all erosion and sediment control and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;
9. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;
10. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

11. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practices;
12. Identification and status of all corrective actions that were required by previous inspection; and
13. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

Within one business day of the completion of an inspection, the Qualified Inspector (QI) shall notify the owner or developer and the appropriate contractor (or subcontractor) of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

Prior to the completion of work, the contractor shall have the QI perform a final site inspection. The QI shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment control measures are no longer required.

Trained Contractor

At minimum, one Trained Contractor shall be on-site on a daily basis during all construction activities that involve soil disturbance. The Trained Contractor will be responsible for conducting daily inspections of the erosion and sediment control practices and ensuring that the erosion and sediment control practices are in good working order. The Trained Contractor must document

these inspections in a log and maintain the log on-site. Refer to Appendix J for the Trained Contractor Daily Inspection Log for a sample report. If an issue is identified, the appropriate contractor (or subcontractor) shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

Suspended Operations

Inspections are to occur as described above until construction is completed and the site is stabilized. During periods of suspended soil disturbance (i.e. winter shutdown and interim site stabilization) less than 12 months in duration, the owner, developer, or contractor may request reduced inspection frequencies in accordance with Part II, Section D of NYS DEC SPDES general permit for stormwater discharges.

For lot line buildings, where the site is stabilized prior to the installation of all SMPs, the owner, developer, or contractor should request reduced QI inspection frequencies. The owner, developer, or contractor must notify DEC a minimum of seven (7) days before the shutdown and submit documentation showing that the site is stable and all SMPs are operational. Site inspections are to be performed by a qualified professional at least once every 30 calendar days. During suspended operations, the disturbed areas must be stabilized. Refer to the section "Temporary Stabilization" for accepted surface stabilization measures.

Winter Stabilization

The contractor shall initiate enhanced surface stabilization measures to manage potential erosion and sediment during construction activities occurring between November 15th and April 1st (winter months). The following modifications to the SWPPP shall be made during Winter Stabilization:

- Snow shall be managed and cleared in a manner that will not impact ongoing construction activities nor increase the potential for sediment laden runoff from melt water.
- Stabilized construction entrances shall be widened to provide access for snow management. Snow management shall not destroy or degrade the installed erosion and sediment control practices. If the erosion and sediment control practices are impacted and can no longer function as intended, the contractor shall take corrective action in a timely manner.

Soil stockpiles must be protected at the end of each work day with 6-mil plastic sheeting or tarp. Alternatively, soil stockpiles may be protected by the use of established vegetation or anchored straw mulch. Silt fence, or hay bales, shall be installed at least 15 feet from the toe of the stockpile.

If construction activities have temporarily ceased, the contractor shall initiate temporary stabilization measures within three days. Refer to the section "Temporary Stabilization" for details and specifications.

POST-CONSTRUCTION STORMWATER CONTROLS

Stormwater management is essential in protecting the receiving waters of the State of New York from the effects of urban stormwater runoff. As such, NYSDEC has developed requirements to improve the protection of these waters. Through the use of stormwater management practices, in accordance with the New York State Stormwater Manual, the water quality and quantity requirements can be achieved.

Water Quality Requirements and Controls

All stormwater will be treated in accordance with NYSDEC standards. NYSDEC requires the treatment of the water quality volume, as defined in Chapter 4 of the SMDM. This volume is designed for the 90% rainfall event number for the State of New York, and derived from the impervious coverage of the development, as well as the contributing drainage area. The water quality volume is required to be treated through the implementation of acceptable stormwater management practices, as listed in Section 5.2 of the SMDM.

Per New York State Stormwater Manual Section 9.2.1, meeting runoff reduction volume sizing criteria is required for the project as there is an increase in impervious area (465,115 sf/10.7 ac) that results in a runoff reduction volume requirement of 11,046 sf.

Water quality controls for this SWPPP have been sized following the criteria of New York State Stormwater Manual. For this project, stormwater management practices (SMPs) are sized to treat 100% of the water quality volume from the disturbed area.

Water Quality Unit (Hydrodynamic Separator) and Bioretention (Filtration)

This project includes bioretention (filtration) basins that provide 14,672 cf of storage volume to meet 100% of the required runoff reduction volume for the site, and provides 36,678 cf of treatment towards the 55,027 cf water quality volume requirement for the site. Two Contech Cascade Hydrodynamic Separators are utilized that provide treatment for the remainder of the site prior to discharging to the Coney Island Creek via 3 outfalls. The CS-10 unit has been sized to treat 29,795 cf equivalent to a peak flow of 8.34 cfs. The CS-4 unit has been sized to treat 5,481 cf. equivalent to a peak flow of 1.53 cfs.

Appendix A includes calculations for the peak water quality discharge for post-construction stormwater management that will be treated by the SMPs. Appendix C contains the specifications of the Contech Cascade Hydrodynamic Separator. Drawing C-402 and C-403 contains the details of the bioretention basins and the Hydrodynamic Separators, respectively.

Post-Construction Stormwater Controls Maintenance

Following the permanent stabilization of all construction activities, the owner is responsible for maintaining the site's stormwater controls.

- Hydrodynamic Separator Unit: Refer to Appendix B for the Hydrodynamic Separator operations and Maintenance (O&M) manual.
- Bioretention Basins: Refer to Appendix B for the bioretention operations and Maintenance (O&M) manual.
- Catch basin and storm manhole sumps shall be inspected and cleaned when 50% of the sump capacity is filled with sediment.
- Inlet grates shall be inspected regularly and debris shall be removed regularly.

CERTIFICATIONS AND FORMS

The following certifications forms are to be reviewed, understood, filled out, and signed by the appropriate personnel at the appropriate time:

-
- The Pre-Construction Documents & Certifications provided in Appendix G shall be filled out by the owner/developer, preparer, and qualified professional, as appropriately shown in the section.
 - The site-specific Construction Duration Inspection form shall be provided in Appendix H and is to be filled out and signed by the qualified professional that performs site inspections and oversee installation of ESCs for this project.
 - The Monthly Summary of Site Inspection Activities form provided in Appendix I is to be filled out and signed by the owner, or the duly authorized representative of the owner.
 - The Contractor's Certification Statement provided in Appendix J is to be filled out and signed by the contractor with primary responsibility for the project site.
 - The Contractor's Certification Statement provided in Appendix J is to be filled out and signed by all subcontractors.
 - The Certificate of Issuance provided in Appendix J is to be filled out and signed by the contractor with primary responsibility for the project site prior to performing any site work.
 - The Erosion and Water Quality Control Identification form provided in Appendix J is to be filled out by the developer/contractor.
 - Records of site work and site stabilization are to be kept on the Construction Stabilization form provided in Appendix J and is to be filled out by the developer/contractor as necessary.
 - The Certificate of Change by the Contractor provided in Appendix K is to be filled out and signed by the contractor upon implementation of any requested changes to the SWPPP by the owner, preparer, or any local authority having jurisdiction over the project site. Changes to the SWPPP are only to be made when the plan or Contractor's implementation proves to be ineffective in eliminating or significantly minimizing pollutants from the construction activity.
 - The Final Stabilization and Retention of Records form provided in Appendix K is to be filled out and signed by the qualified professional that will perform site inspections and oversee installation of erosion control measures for this project.
 - The Certificate of Return provided in Appendix K is to be filled out and signed by the contractor and owner/developer after final stabilization of the site has been completed.

RETENTION OF RECORDS

The following are to be retained by the owner at the site and for a period of five years from the date the site is finally stabilized:

- SWPPP
- Contract Documents including contract drawings and technical specifications
- Stormwater inspections and maintenance reports
- Contractor Certification
- SWPPP Certification Statement of Satisfactory Completion
- Correspondence regarding stormwater practices

REFERENCES

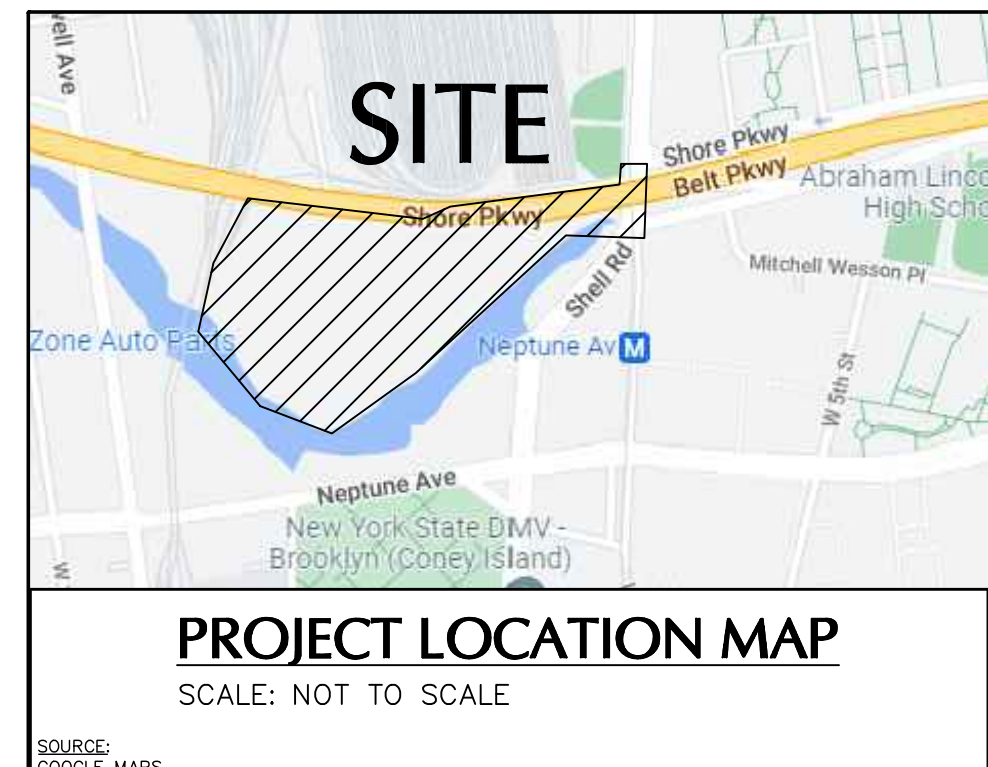
New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), New York State Department of Environmental Conservation, November 2016.

New York State Stormwater Management Design Manual, New York State Department of Environmental Conservation, January 2015.

SPDES General Permit for Stormwater Discharges from Construction Activities, New York State Department of Environmental Conservation (Permit No. GP-0-20-001), January 2020

Urban Hydrology for Small Watersheds – TR-55. United States Department of Agriculture, June 1986.

DRAWINGS



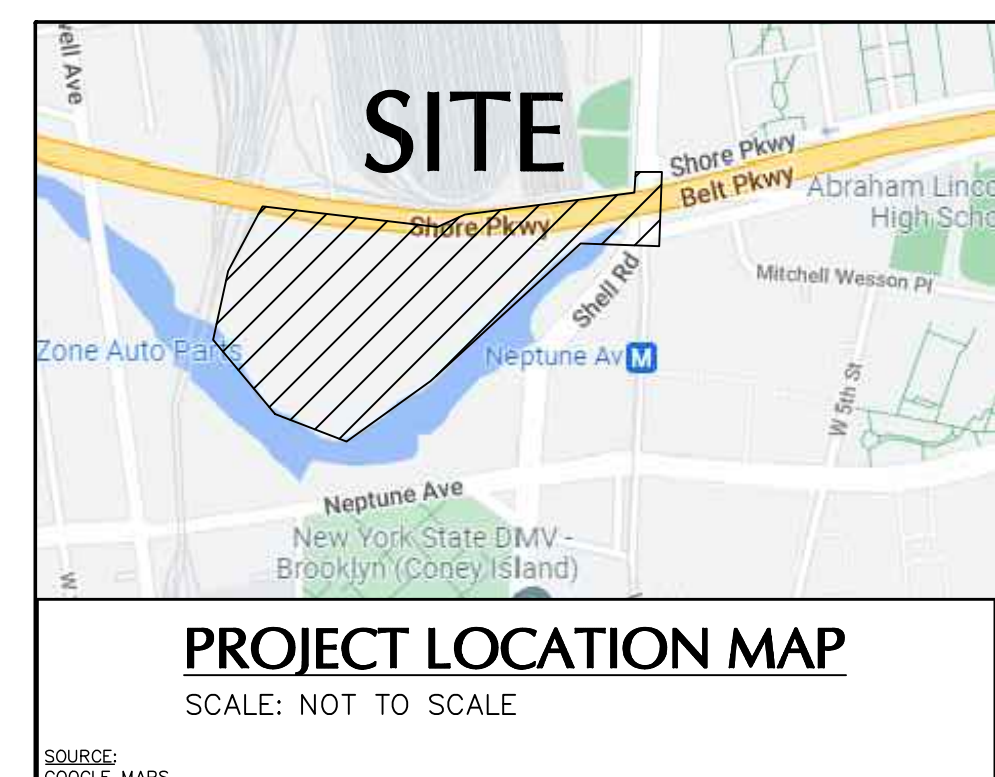
LEGEND (NOT SHOWN TO SCALE)

- | | |
|--|--|
| | HYDRANT |
| | STAND PIPE |
| | VENT PIPE |
| | PEDESTAL LIGHT |
| | STREET LIGHT |
| | SIGNAL POLE |
| | POWER POLE |
| | GUY WIRE |
| | MANHOLE (TYPE AS LABELED) |
| | WATER VALVE |
| | GAS VALVE |
| | UNKNOWN VALVE |
| | CATCH BASIN |
| | SPOT ELEVATION |
| | CLEAN OUT |
| | TREE |
| | SIGN |
| | BOLLARD |
| | ELECTRIC BOX |
| | ELECTRIC METER |
| | GAS METER |
| | WATER METER |
| | TELEPHONE BOX |
| | TRAFFIC SIGNAL POLE |
| | MONITOR WELL |
| | NORTH |
| | SOUTH |
| | EAST |
| | WEST |
| | ON LINE |
| | METAL COVER |
| | BOTTOM OF WALL |
| | TOP OF WALL |
| | BOTTOM OF CURB |
| | TOP OF CURB |
| | DROP CURB |
| | FINISHED FLOOR |
| | OVERHEAD WIRE |
| | GUIDE RAIL, WOOD |
| | GUIDE RAIL, METAL |
| | TREE LINE |
| | CHAINLINK FENCE |
| | STOCKADE FENCE |
| | IRON FENCE |
| | CONSTRUCTION FENCE |
| | EASEMENT LINE |
| | PROPERTY LINE |
| | RIGHT-OF-WAY LINE |
| | CONTOUR LINE |
| | GAS MARK OUT LINE |
| | WATER MARK OUT LINE |
| | ELECTRIC MARK OUT LINE |
| | COMMUNICATION MARK OUT LINE |
| | SANITARY MARK OUT LINE |
| | DRAINAGE MARK OUT LINE |
| | UNKNOWN UTILITY MARK OUT LINE |
| | REFERENCE UTILITY LINE (TYPE AS NOTED) - PLOTTED FROM EXISTING MAPPING |
| | PRELIMINARY FLOOD ZONE (SEE NOTE 7) |
| | CURRENT FLOOD ZONE (SEE NOTE 7) |
| | EXCEPTIONS AS NOTED FROM TITLE REPORT (SEE NOTES 1E & 2) |

ALTA CERTIFICATION

- PRILOGIS LLC, A DELAWARE LIMITED PARTNERSHIP; SUCCESSORS AND ASSIGNS
 REALTAS PROTECT OF NEW YORK, LLC
 UNITED TITLE INSURANCE COMPANY
 2731 N 17TH STREET, LCA, A DELAWARE UNLIMITED LIABILITY COMPANY
- I HEREBY STATE THAT THIS PLAN IS BASED ON THE FIELD SURVEY MADE BY ME OR UNDER MY IMMEDIATE SUPERVISION IN ACCORDANCE WITH THE USUAL COURSE OF PRACTICE FOR LAND SURVEYS, AND TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF, AND IN MY PROFESSIONAL CAPACITY, IT REPRESENTS THE CONDITIONS FOUND ON THE DATE OF THE FIELD SURVEY AT THE SUBJECT PROPERTY AND:
- IT IS TO BE CERTIFY THAT THIS MAP OR PLAN OF THE SURVEY ON WHICH IT IS BASED WAS PREPARED OR MADE IN ACCORDANCE WITH THE 2001 MANSION OF THE LEGAL REQUIREMENTS FOR ALL TYPES OF LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPED BY ALTA AND THE NATIONAL BOARD OF STANDARDIZING AND INSPECTION OF SURVEYING, AND THAT THE FIELD WORK HAS BEEN DONE IN ACCORDANCE WITH THE 1985 EDITIONS OF THE MANUAL OF SURVEYING, CHAPTERS 14, 16, 17, 18, AND 19 OF TABLE A THEREOF.
- DATED THIS _____ DAY OF _____, DECEMBER 6, 2023.
- _____
 JAMES W. FISHER
 PROFESSIONAL LAND SURVEYOR
 NO. 05078-A-1 NO. 05078-B-1
- Date: _____ 1-26-2024
- Signed: _____

Date	Description	No.
<div> <div>REVISIONS</div> <div>  <p> LANGAN Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. 21 Penn Plaza, 8th Floor New York, NY 10001 </p> </div> </div>		
T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project		
<div> <div> 2731 WEST 12TH STREET </div> <div> BLOCK No. 7947, LOT No. 106 CONEY ISLAND, BROOKLYN NEW YORK </div> </div>		
KINGS COUNTY		NEW YORK
Drawing Title		
<div> <div> ALTA/NSP LAND TITLE SURVEY SURVEY </div> <div> 170697301 </div> </div>		
Project No.	Drawing No.	
Date	<div> <div>12/20/2023</div> <div>VL101</div> </div>	
Drawn By		
Checked By		
PDF	Sheet 01 of 02	



SEE SHEET 1 FOR NOTES

LEGEND

(NOT SHOWN TO SCALE)

- | | |
|--|--|
| | HYDRANT |
| | STAND PIPE |
| | VENT PIPE |
| | PEDESTAL LIGHT |
| | STREET LIGHT |
| | SIGNAL POLE |
| | POWER POLE |
| | GUT WIRE |
| | MANHOLE (TYPE AS LABELED) |
| | WATER VALVE |
| | GAS VALVE |
| | UNKNOWN VALVE |
| | CATCH BASIN |
| | SPOT ELEVATION |
| | CLEAN OUT |
| | TREE |
| | SIGN |
| | BOLLARD |
| | ELECTRIC BOX |
| | ELECTRIC METER |
| | GAS METER |
| | WATER METER |
| | TELEPHONE BOX |
| | TRAFFIC SIGNAL POLE |
| | MONITOR WELL |
| | NORTH |
| | SOUTH |
| | EAST |
| | WEST |
| | ON LINE |
| | METAL COVER |
| | BOTTOM OF WALL |
| | TOP OF WALL |
| | BOTTOM OF CURB |
| | TOP OF CURB |
| | DROP CURB |
| | FINISHED FLOOR |
| | OVERHEAD WIRE |
| | GUIDE RAIL WOOD |
| | GUIDE RAIL METAL |
| | TREE LINE |
| | CHAINLINK FENCE |
| | STAKEOUT FENCE |
| | IRON FENCE |
| | CONSTRUCTION FENCE |
| | EASEMENT LINE |
| | PROPERTY LINE |
| | RIGHT-OF-WAY LINE |
| | CONTOUR LINE |
| | GAS MARK OUT LINE |
| | WATER MARK OUT LINE |
| | ELECTRIC MARK OUT LINE |
| | COMMUNICATION MARK OUT LINE |
| | SANITARY MARK OUT LINE |
| | DRAINAGE MARK OUT LINE |
| | UNKNOWN UTILITY MARK OUT LINE |
| | REFERENCE UTILITY LINE (TYPE AS NOTED) - PLOTTED FROM EXISTING MAPPING |
| | PRELIMINARY FLOOD ZONE (SEE NOTE 7) |
| | CURRENT FLOOD ZONE (SEE NOTE 7) |
| | EXCEPTIONS AS NOTED FROM TITLE REPORT (SEE NOTES 1 & 2) |

ALTA CERTIFICATION

1. PROLOGOS L.P.A. A DELAWARE LIMITED PARTNERSHIP, SUCCESSORS AND ASSIGNS
2. RALPH ABSTRACT OF NEW YORK, LLC
3. CHICAGO TITLE INSURANCE COMPANY
4. 7351 ST 12TH STREET, L.C. A DELAWARE LIMITED LIABILITY COMPANY

WHEREAS IT IS CERTIFIED THAT THIS PLAN IS BASED ON A FIELD SURVEY MADE BY ME OR UNDER MY SUPERVISION AND IN ACCORDANCE WITH THE MAPS CODE OF PRACTICE FOR LAND SURVEYORS AND TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF, AND IN MY PROFESSIONAL OPINION, CORRECTLY REPRESENTS THE CONDITIONS FOUND ON THE DATE OF THE FIELD SURVEY AT THE SUBJECT PROPERTY" AND

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DATE REQUIREMENTS FOR ALTA/ALPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND ALPS, WHICH INCLUDES THE FOLLOWING: 1. S, 1102.1, 1.4, 16, 17, 18, AND 19 OF TABLE A THEREOF.

ONE

Date: 1-26-2024

Signature:  D. FISHER
PROFESSIONAL LAND SURVEYOR
No. 050784-1

OVERALL SURVEY DESCRIPTION (LESS POSSIBLE GORE)

ALL THAT CERTAIN PLOT, PIECE, OR PARCEL OF LAND, SITUATE, LYING, AND BEING IN THE BOROUGH OF BROOKLYN, KINGS COUNTY, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE EASTERLY LINE OF STEWELL AVENUE (MAPPED 10 FEET WIDE) WITH THE SOUTHERLY LINE OF SHORE PARKWAY (VARIABLE WIDTH), AND RUNNING THE FOLLOWING FOUR (4) COURSES ALONG THE SAID SOUTHERLY LINE OF SHORE PARKWAY TO THE POINT OF PLACE OF BEGINNING:

A. SOUTH 70°32'46" EAST, A DISTANCE OF 432.42 FEET TO A POINT; THENCE
B. NORTH 04°50'04" EAST, A DISTANCE OF 49.82 FEET TO A POINT; THENCE
C. SOUTH 84°30'10" EAST, A DISTANCE OF 73.41 FEET TO A POINT; THENCE
D. SOUTH 80°14'17" EAST, A DISTANCE OF 163.62 FEET TO THE POINT OR PLACE OF BEGINNING AND RUNNING; THENCE;

[illegible][illegible]

ALONG LOT 30 THE FOLLOWING TWO (2) COURSES,
NORTH 17°24'37" EAST, A DISTANCE OF 174.76 FEET TO A POINT; THENCE
NORTH 28°46'13" EAST, A DISTANCE OF 316.61 FEET TO THE POINT OR PLACE OF BEGINNING.
ENCLOSING AN AREA OF 724,848 SQUARE FEET OR 16.64023 ACRES, MORE OR LESS

OVERALL SURVEY DESCRIPTION

ALL THAT CERTAIN PLOT, PIECE, OR PARCEL OF LAND, SITUATE, LYING, AND BEING IN THE BOROUGH OF BROOKLYN, KINGS COUNTY, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE EASTORY LINE OF STRUHLER AVENUE (MAPPED 15 FEET WIDE) WITH THE SOUTHERLY LINE OF SHORE PARKWAY (VARIABLE WIDTH), AND RUNNING TO FOLLOWING FOUR (4) COURSES ALONG THE SAID SOUTHERLY LINE OF SHORE PARKWAY TO 7-POINT OR PLACE OF BEGINNING:

A. SOUTH 76°02'46" EAST, A DISTANCE OF 432.42 FEET TO A POINT; THENCE,
B. NORTH 04°55'04" EAST, A DISTANCE OF 49.82 FEET TO A POINT; THENCE,
C. SOUTH 84°30'70" EAST, A DISTANCE OF 73.41 FEET TO A POINT; THENCE,
D. NORTH 80°54'17" EAST, A DISTANCE OF 163.62 FEET TO THE POINT OR PLACE OF BEGINNING AND RUNNING; THENCE;

SOUTH 80°31'17" EAST, ALONG SAID SOUTHERLY LINE SHORE PARKWAY, A DISTANCE OF 286.5 FEET TO A POINT ON THE WESTERLY LINE OF LOT 13; THENCE
 ALONG LOT 13 TO THE POINT OF BEGINNING;
 SOUTH 43°37'50" EAST, A DISTANCE OF 61.79 FEET TO A POINT; THENCE
 SOUTH 43°37'50" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 SOUTH 43°37'50" EAST, A DISTANCE OF 72.47 FEET TO A POINT; THENCE
 SOUTH 43°37'50" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 SOUTH 80°31'17" EAST, A DISTANCE OF 31.32 FEET TO A POINT; THENCE
 SOUTH 43°37'50" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 SOUTH 80°32'18" EAST, A DISTANCE OF 30.50 FEET TO A POINT; THENCE
 SOUTH 43°37'50" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 SOUTH 80°31'17" EAST, A DISTANCE OF 43.21 FEET TO A POINT; THENCE
 ALONG SAID SOUTHERLY LINE SHORE PARKWAY, TO THE INTERSECTION
 SOUTHERLY LINE OF SHORE PARKWAY; THENCE
 ALONG SAID SOUTHERLY LINE SHORE PARKWAY, A DISTANCE OF 36.73 FEET
 TO A POINT; THENCE
 ALONG SAID SOUTHERLY LINE SHORE PARKWAY, ON A CURVE TO THE LEFT LEAVING
 A RADIUS OF 1,625.00 FEET, AND A CENTRAL ANGLE OF 92°54'44", BEING SUBTENDED BY
 AN ARC OF 367.3 FEET, TO A POINT ON THE WESTERLY LINE OF LOT 13; THENCE
 ALONG LOT 13 TO A POINT ON THE WESTERLY LINE OF LOT 21B; THENCE
 ALONG LOT 21B TO THE POINT OF BEGINNING;
 SOUTH 63°17'14" EAST, A DISTANCE OF 47.75 FEET TO A POINT; THENCE
 SOUTH 63°17'14" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 NORTH 62°28'28" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 NORTH 62°28'28" EAST, A DISTANCE OF 10.00 FEET TO A POINT; THENCE
 ALONG SAID SOUTHERLY LINE SHORE PARKWAY, TO THE INTERSECTION OF
 CLEVELAND CIRCLE; THENCE
 ALONG SAID CLEVELAND CIRCLE, IN THE SENSE OF CLOCK, THE FOLLOWING SEVENTEEN (17) POINTS:

[illegible]

ALONG LOT 30 THE FOLLOWING TWO (2) COURSES,
NORTH 17°24'37" EAST, A DISTANCE OF 174.76 FEET TO A POINT; THENCE
NORTH 28°46'15" EAST, A DISTANCE OF 316.61 FEET TO THE POINT OR PLACE OF BEGINNING.
ENCLOSING AND AREA OF 730,989 SQUARE FEET OR 16,781.20 ACRES, MORE OR LESS

POSSIBLE GORE SURVEY DESCRIPTION

ALL THAT CERTAIN PLOT, PIECE, OR PARCEL OF LAND, SITUATE, LYING, AND BEING IN THE BOROUGH OF BROOKLYN, KINGS COUNTY, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE EASTERN LINE OF STILLWELL AVENUE (MAAPPED 100 FEET WIDE) WITH THE SOUTHERLY LINE OF SHORE PARKWAY (VARIABLE WIDTH), AND RUNNING THE FOLLOWING FIVE (5) CURVES ALONG THE SAID SOUTHERLY LINE OF SHORE PARKWAY TO THE POINT OF PLACE OF BEGINNING:

A. SOUTH 76°02'46" EAST, A DISTANCE OF 432.42 FEET TO A POINT; THENCE,
B. NORTH 04°55'04" EAST, A DISTANCE OF 498.92 FEET TO A POINT; THENCE,
C. SOUTH 84°30'10" EAST, A DISTANCE OF 73.41 FEET TO A POINT; THENCE,
D. NORTH 17°17" EAST, A DISTANCE OF 207.81 FEET TO A POINT; THENCE,
E. ALONG A CURVE TO THE LEFT HAVING A RADIUS OF 3,625.00 FEET, AN ARC LENGTH OF 382.59

FEET, A CENTRAL ANGLE OF 00°20'00" AND BEING SURVEYED BY A CHORD WHICH BEARS SOUTH 09°20'00" EAST, A DISTANCE OF 362.45 FEET TO THE POINT ON PLACE OF BEGINNING AND RUNNING THENCE

CONTINUING ALONG A CURVE TO THE LEFT WITH A RADIUS OF 1,062.00 FEET, AN ARC LENGTH OF 211.31 FEET, AN ANGLE OF 02°20'00" AND BEING SURVEYED BY A CHORD WHICH BEARS NORTH 87°24'42" EAST, A DISTANCE OF 24.15 FEET TO A POINT, THENCE

SOUTH 63°27'11" EAST, A DISTANCE OF 47.75 FEET TO A POINT, THENCE

SOUTH 75°50'10" EAST, A DISTANCE OF 80.88 FEET TO A POINT, THENCE

SOUTH 82°52'00" EAST, A DISTANCE OF 120.38 FEET TO A POINT, THENCE

SOUTH 80°07'00" EAST, A DISTANCE OF 44.55 FEET TO A POINT ON THE MEAN HIGH WATERLINE OF COCONA ISLAND, OCEAN, BEING SURVEYED BY A CHORD WHICH BEARS NORTH 41°42'30" WEST, A DISTANCE OF 21.16 FEET TO A POINT, THENCE

SOUTH 55°15'00" WEST, A DISTANCE OF 22.16 FEET TO A POINT, THENCE

SOUTH 72°15'00" WEST, A DISTANCE OF 47.75 FEET TO A POINT, THENCE

NORTH 82°52'00" EAST, A DISTANCE OF 136.00 FEET TO A POINT, THENCE

NORTH 40°50'00" EAST, A DISTANCE OF 10.00 FEET TO A POINT ON PLACE OF BEGINNING

ENCLOSING AN AREA OF 6141 SQUARE FEET OR 0.1409 ACRES, MORE OR LESS

BLOCK 7247
LOT 106
AREA=730,989 S.F.±
16.78120 ACRES ±
(LESS POSSIBLE GORE
AREA=724,848S.F.±
16.64023 ACRES ±)

PROPOSED
GRAVESEND SHIP CANAL
(200' WIDE)
(SEE NOTE 1Q)

PROPOSED
CANAL AVENUE
(100' WIDE) ²⁷⁶⁰
(SEE NOTE 1Q)

MATCH LINE

CONY ISLAND CREEK

2731 WEST 12TH

STREET
BLOCK No. 7247, LOT No. 106
CONEY ISLAND, BROOKLYN
NEW YORK

KINGS COUNTY	NE
Drawing Title	

ALTA/NSPS LAN
TITLE SURVEY
SURVEY

Project No.	Drawing No.
-------------	-------------

170697301	
Date	V/L 1 C

12/20/2023	VLT
Drawn By	

NT/M	
Checked By	
PDF	Sheet 02 of

1-EX0101.dwg Date: 1/22/2024 Time: 17:00 User: jrcgill Style Table: Longans.ctb La



LEGEND
PROPERTY LINE
SITE AREA

SITE AERIAL PLAN
SCALE: 1" = 50'



- GENERAL NOTES:
- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C.; DATED DECEMBER 20, 2023.
 - ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929 (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		
SIGNATURE PROFESSIONAL MICHELE E. O'CONNOR STATE LIC. No. 086302		DATE SIGNED
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project		
2731 WEST 12TH STREET SWPPP		
BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY Drawing Title		
SITE AERIAL PLAN		
Project No. 170697301		Drawing No.
Date 11/27/2024		C-001
Drawn By MG		
Checked By BC		
Sheet 1 of 13		



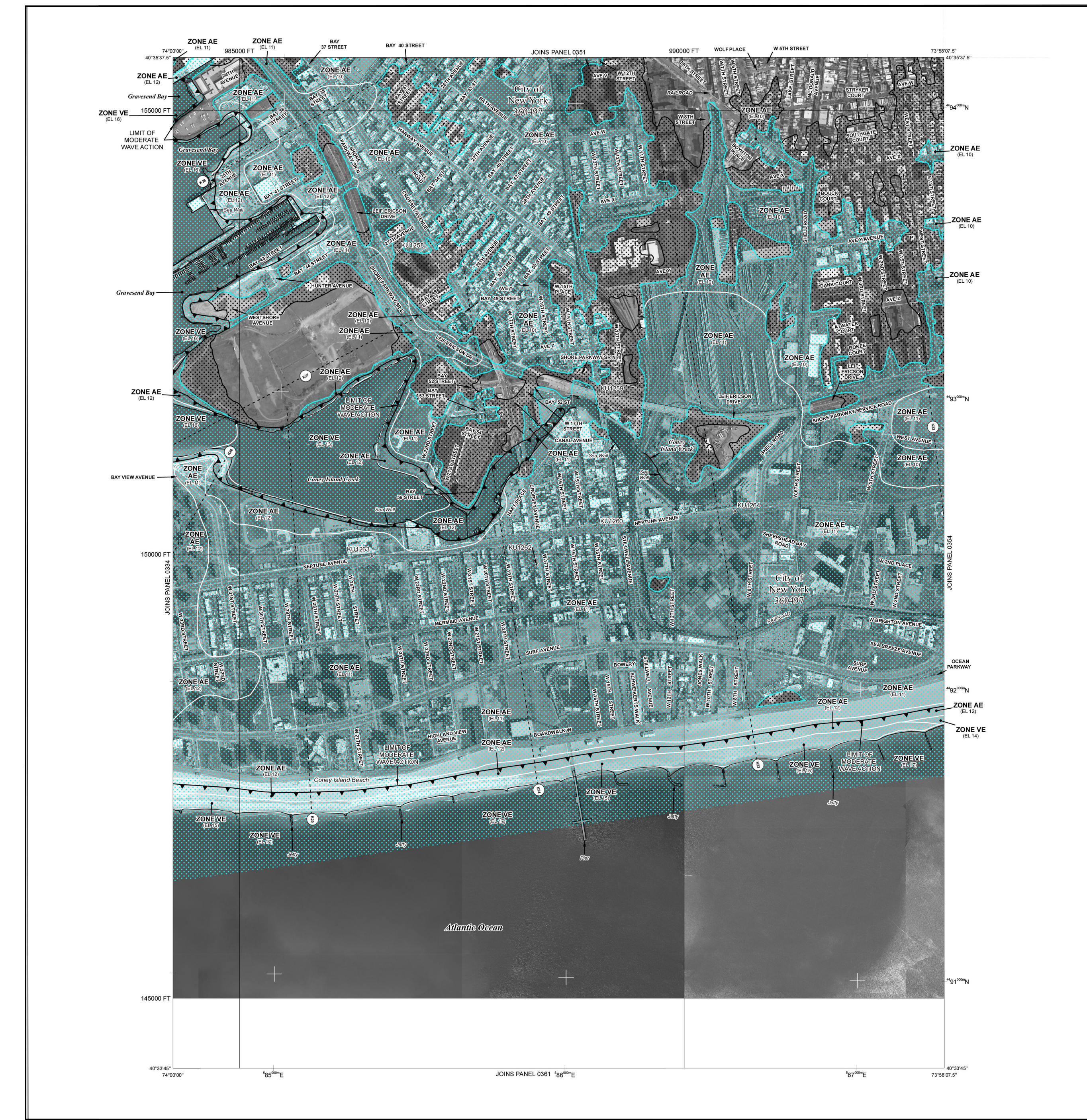
HISTORIC SITE PHOTOGRAPH TAKEN 2018
SCALE: N.T.S.

HISTORIC SITE PHOTOGRAPH TAKEN 2022
SCALE: N.T.S.

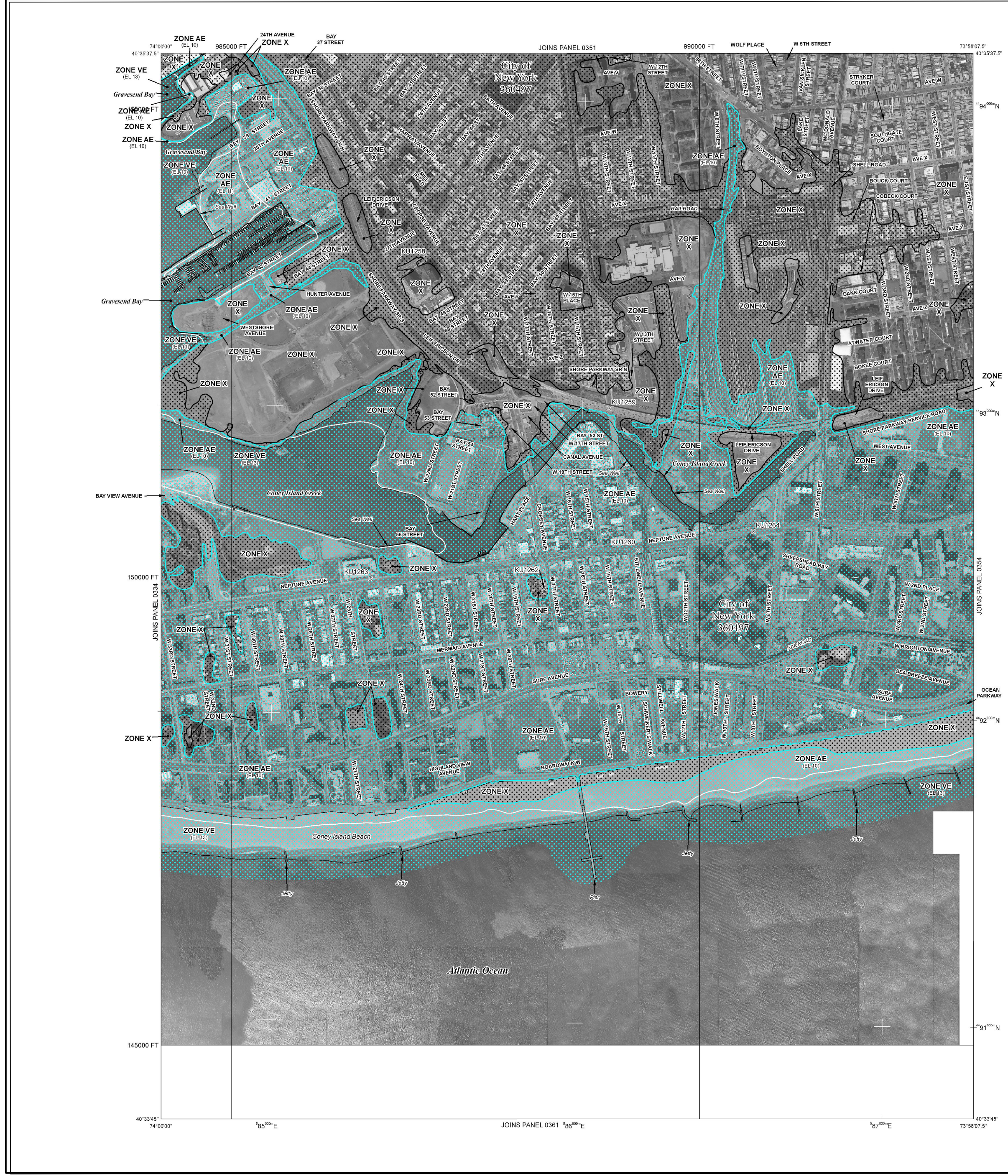
GENERAL NOTES:
1. HISTORIC PHOTOS TAKEN FROM NYC THEN & NOW GIS ONLINE ACCESSED OCTOBER, 2024.

WARNING: IT IS A VIOLATION OF THE NYS
EDUCATION LAW ARTICLE 145 FOR ANY PERSON,
UNLESS HE IS ACTING UNDER THE DIRECTION OF A
LICENSED PROFESSIONAL ENGINEER, LAND
SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN
ANY WAY.

Date	Description	No.
		
SIGNATURE PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		DATE SIGNED
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project 2731 WEST 12TH STREET SWPPP BLOCK No. 7247, LOT No. 106 BROOKLYN KINGS COUNTY NEW YORK		
Drawing Title HISTORICAL PHOTOS		
Project No. 170697301	Drawing No. C-002	
Date 12/20/2024	Drawn By MG	
Checked By BC	Sheet 2 of 13	



PRELIMINARY FEMA FIRM MAP
SCALE: N.T.S.

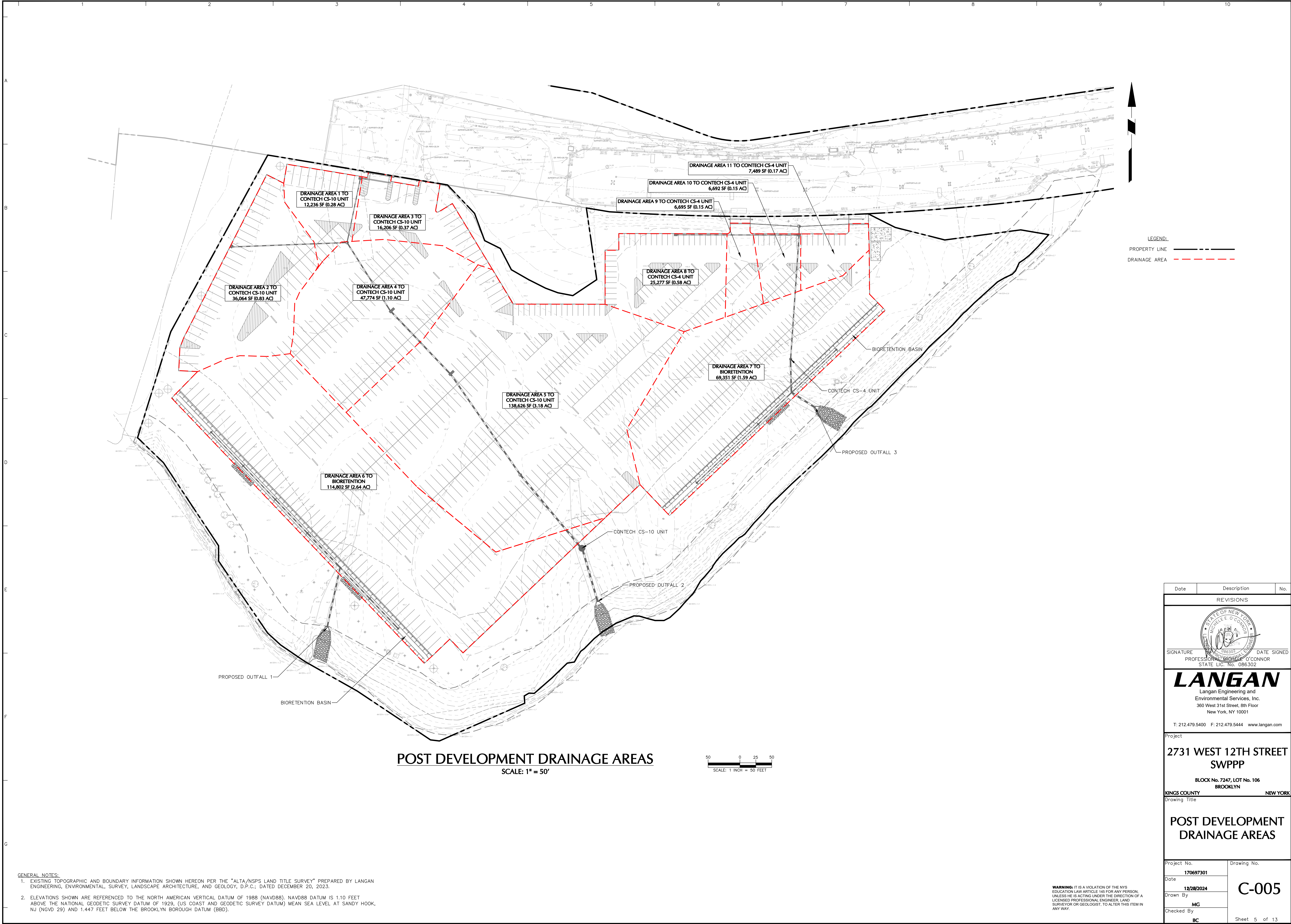


EFFECTIVE FEMA FIRM MAP
SCALE: N.T.S.

GENERAL NOTES:
1. FEMA MAPS TAKEN FROM LANGAN SITE ANALYZER ACCESSED OCTOBER, 2024.

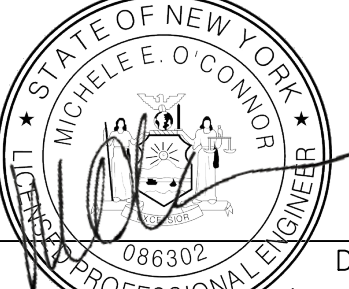
WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

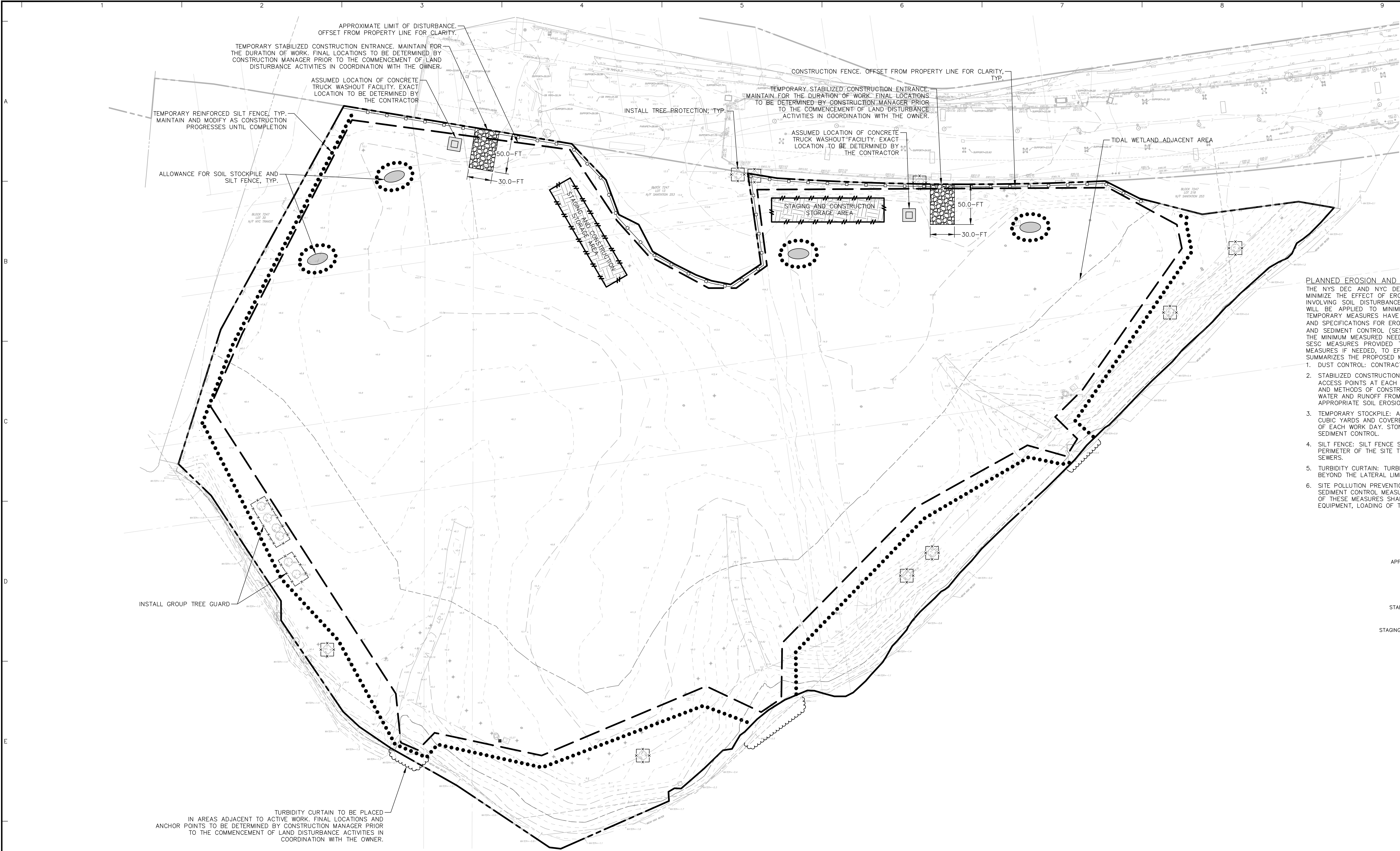
Date	Description	No.
REVISIONS		
SIGNATURE: PROFESSIONAL MICHELE O'CONNOR DATE SIGNED: 12/20/2024 STATE LIC. No. 086302		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project: 2731 WEST 12TH STREET SWPPP		
BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY Drawing Title: FEMA FIRM MAPS		
Project No. 170697301	Drawing No. C-003	Sheet 3 of 13



GENERAL NOTES:
1. EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C.; DATED DECEMBER 20, 2023.
2. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929 (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).

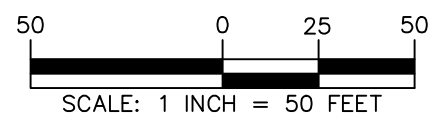
WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		
		
SIGNATURE: 		DATE SIGNED: 12/28/2024
PROFESSIONAL ENGINEER, LAND SURVEYOR STATE LIC. NO. 086302		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project 2731 WEST 12TH STREET SWPPP BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY Drawing Title POST DEVELOPMENT DRAINAGE AREAS		
Project No. 170697301		Drawing No. C-005
Date 12/28/2024		
Drawn By MG		
Checked By BC		Sheet 5 of 13



EROSION & SEDIMENT CONTROL PLAN - PHASE 1

SCALE: 1" = 50'



NOTES:

- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C.; DATED DECEMBER 20, 2023.
- ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929, (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).
- SOIL EROSION AND SEDIMENT CONTROL NOTES:**
 - THE CONTRACTOR IS RESPONSIBLE FOR ENSURING ALL WORK CONFORMS WITH ALL FEDERAL, STATE, COUNTY OR LOCAL CODES HAVING JURISDICTION OVER SUCH WORK.
 - THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OSHA REGULATIONS AND SAFETY PROCEDURES TO ENSURE PERSONNEL HEALTH AND SAFETY. THE CONTRACTOR MUST MAINTAIN A SAFE AND CLEAN WORKING ENVIRONMENT AND SHALL ENSURE PROPER PERSONAL PROTECTIVE EQUIPMENT IS WORN AT ALL TIMES. IN AREAS WHERE PEDESTRIAN AND/OR VEHICULAR TRAFFIC MAY BE AFFECTED BY THE WORK, THE CONTRACTOR SHALL CORDON OFF THE WORK AREA.
 - PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL VISIT THE SITE AND SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UTILITIES, STRUCTURES OR ANY OTHER ELEMENTS WHICH MAY IMPEDE WORK, UTILITY AND/OR STRUCTURE RELOCATIONS, IF NECESSARY, SHALL BE COORDINATED THROUGH THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.
 - IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY, COORDINATE AND STAGE OR SEQUENCE HIS WORK WITH ANY OTHER PLANNED OR ONGOING CONSTRUCTION ACTIVITIES AT THE SITE.
 - THE CONTRACTOR SHALL COORDINATE ANY STAGE WORK, LAY DOWN, AND STORAGE AREA LOCATIONS AND ACCESS WITH OWNER, PRIOR TO START OF WORK.
 - ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES ON THIS PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL AND SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITY (PERMIT NO. GP-D-20-001). THESE MEASURES SHALL BE IN INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCE OR IN THE PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.

- CATCH BASINS WITHIN AND DOWNSTREAM OF THE WORK AREA SHALL BE PROTECTED WITH FILTER FABRIC THROUGHOUT THE CONSTRUCTION PERIOD UNTIL THE WORK AREA IS PERMANENTLY STABILIZED.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAINTAINING THE SECURITY OF THE PROJECT SITE DURING ALL WORKING AND NON-WORKING HOURS, SEVEN DAYS A WEEK. CONTRACTOR SHALL PROVIDE A PLAN, WHICH SHALL BE APPROVED BY THE OWNER, SHOWING FENCE LAYOUT, GATE, & SIGN LOCATIONS.
- ALL DEBRIS CREATED BY THE CONTRACTOR IN THE IMMEDIATE VICINITY OF WORK SHALL BE RECOVERED AND PROPERLY DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER
- ALL CONSTRUCTION VEHICLES HAULING MATERIALS EITHER INTO OR OUT OF THE CONSTRUCTION AREA SHALL HAVE A SECURED TARP OVER MATERIALS TO PREVENT SEDIMENT POLLUTION OF PUBLIC ROADWAYS.
- IF REQUIRED, THE CONTRACTOR SHALL REQUEST WRITTEN APPROVAL FROM THE OWNER'S REPRESENTATIVE FOR TEMPORARY SHUTDOWN OF UTILITIES, A MINIMUM OF THREE WORKING DAYS IN ADVANCE.
- ALL SITE EROSION AND SEDIMENT CONTROL (SESC) MEASURES SHOWN ON THE PLANS ARE MINIMUM MEASURES REQUIRED. THE SOIL EROSION NEEDS WILL VARY THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE INCREASE SESC MEASURES AND CONTROLS, IN ACCORDANCE WITH NYSDEC STANDARDS, AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEMS OR THE SURROUNDING WATERBODIES DURING CONSTRUCTION. THE OWNER, NYSDEC, NYCDEP, OR THE ARCHITECT MAY REQUEST ADDITIONAL MEASURES AND CONTROLS TO MINIMIZE THE POTENTIAL FOR ONSITE OR OFFSITE PROBLEMS THAT MAY OCCUR DURING CONSTRUCTION.
- ANY LAND DISTURBED AND EXPOSED FOR MORE THAN 7 DAYS AND NOT IN ACTIVE USE SHALL BE SEEDED. SHOULD THE SEASON PREVENT THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS SHALL BE MULCHED WITH STRAW OR APPROVED EQUIVALENT. THE SEEDING SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR TEMPORARY SEEDING.
- CONTRACTOR SHALL IMMEDIATELY STABILIZE AREAS WHERE SLOPES ARE GREATER THAN 3 TO 1.
- PAVED ROADWAYS AND CONSTRUCTION ACCESS POINTS SHALL BE MAINTAINED IN A CLEAN STATE AT ALL TIMES.

- THE SITE SHALL BE GRADED AND MAINTAINED TO DIVERT ALL STORMWATER RUNOFF TOWARDS SOIL EROSION AND SEDIMENT CONTROL MEASURES.
- THE CONTRACTOR SHALL IMPLEMENT DUST CONTROL MEASURES DURING CONSTRUCTION. THE CONTRACTOR IS TO MINIMIZE DUST CLOUDS BY SPRINKLING CONSTRUCTION AREA WITH POTABLE WATER OR OTHER NYSDEC APPROVED METHODS. MAINTAIN DUST CONTROL MEASURES THROUGH DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS ARE STABILIZED.
- CONTRACTOR SHALL OBSERVE FUNCTION AND ADEQUACY OF SESC MEASURES DURING INSPECTIONS OCCURRING A MINIMUM OF ONCE PER WEEK AND IF THOSE ARE NOT SUFFICIENT, ADDITIONAL SOIL EROSION MEASURES SHALL BE IMPLEMENTED.
- ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL FINAL ACCEPTANCE OF THE WORK BY THE OWNER UPON CERTIFICATION OF FINAL ACCEPTANCE. THE OWNER SHALL ASSUME RESPONSIBILITY FOR THE CONTINUED MAINTENANCE OF PERMANENT SOIL EROSION AND SEDIMENT CONTROL MEASURES.

CONSTRUCTION PROGRAM:

- FLAG THE WORK LIMITS AND ITEMS TO BE PROTECTED (I.E. TREES)
- INSTALL SILT FENCE AND CONSTRUCTION BARRIERS AS NEEDED.
- COMPLETE SITE REMOVALS FOR THE SITE AS NEEDED.
- REMOVE EROSION CONTROL ITEMS WHEN EARTHWORK IS COMPLETE AND ALL PERMANENT SURFACES ARE IN PLACE AND ESTABLISHED.
- KEEP AREAS BEYOND SITE IN CLEAN, CLEAR CONDITION DURING COURSE OF WORK.

MAINTENANCE NOTES:

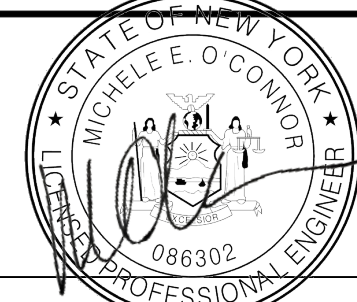
- FINAL CONSTRUCTION SEQUENCING AND STAGING PLANS SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO THE START OF CONSTRUCTION.
- THE SITE CONTRACTOR WILL BE RESPONSIBLE FOR THE PROPER CONSTRUCTION AND MAINTENANCE OF ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES AND RELATED ITEMS INCLUDED WITHIN THIS PLAN. THE SITE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR THE PROPER CONSTRUCTION AND STABILIZATION OF PERMANENT CONTROL MEASURES AND RELATED ITEMS INCLUDED WITHIN THIS PLAN THROUGH COMPLETION OF CONSTRUCTION.

- PLANNED EROSION AND SEDIMENT CONTROL MEASURES:**
- THE NYS DEC AND NYC DEP REQUIRES THE IMPLEMENTATION OF PROTECTIVE MEASURES TO MINIMIZE THE EFFECT OF EROSION AND SEDIMENT MOVEMENT DUE TO CONSTRUCTION ACTIVITIES INVOLVING SOIL DISTURBANCE. TEMPORARY SOIL EROSION AND SEDIMENT CONTROL MEASURES WILL BE APPLIED TO MINIMIZE THE AMOUNT OF SEDIMENT TRACKED FROM THE SITE. THE TEMPORARY MEASURES HAVE BEEN DESIGNED IN ACCORDANCE WITH THE NYS DEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (NOVEMBER 2016). THE SOIL EROSION AND SEDIMENT CONTROL (SESC) MEASURES ON THESE PLANS AND AS DESCRIBED BELOW ARE THE MINIMUM MEASURED NEEDED TO MEET THE REQUIREMENTS. CONTRACTOR SHALL ADJUST THE SESC MEASURES PROVIDED THROUGHOUT CONSTRUCTION, INCLUDING PROVIDING SUPPLEMENTAL MEASURES IF NEEDED, TO EFFECTIVELY CONTROL EROSION AND SEDIMENTATION. THE FOLLOWING SUMMARIZES THE PROPOSED MEASURES:
- DUST CONTROL: CONTRACTOR SHALL CONTROL EXCESSIVE DUST BY WATER SPRINKLING.
 - STABILIZED CONSTRUCTION ACCESS: CONTRACTOR SHALL INSTALL STABILIZED CONSTRUCTION ACCESS POINTS AT EACH POINT OF EXIT/ENTRY REQUIRED BY THE CONTRACTOR'S MEANS AND METHODS OF CONSTRUCTION PRIOR TO THE COMMENCEMENT OF WORK. WASH-DOWN WATER AND RUNOFF FROM THE CONSTRUCTION ACCESS PAD SHALL BE DIRECTED TO APPROPRIATE SOIL EROSION AND SEDIMENT CONTROL MEASURES.
 - TEMPORARY STOCKPILE: ALL SOIL STOCKPILES SHALL BE LIMITED IN SIZE TO ABOUT 1,000 CUBIC YARDS AND COVERED WITH MINIMUM 6 MIL PLASTIC SHEETING OR TARPS AT THE END OF EACH WORK DAY. STONE STOCKPILES DO NOT REQUIRE ANY PARTICULAR EROSION AND SEDIMENT CONTROL.
 - SILT FENCE: SILT FENCE SHALL BE INSTALLED AT DOWNSTREAM LOCATIONS ALONG THE PERIMETER OF THE SITE TO PREVENT SEDIMENT LADEN RUNOFF FROM DISCHARGING TO CITY SEWERS.
 - TURBIDITY CURTAIN: TURBIDITY CURTAINS SHALL BE INSTALLED WITHIN THE WATERBODY BEYOND THE LATERAL LIMITS OF CONSTRUCTION SITE AND FIRMLY ANCHORED IN PLACE.
 - SITE POLLUTION PREVENTION: CONTRACTOR SHALL INSTALL STANDARD SOIL EROSION AND SEDIMENT CONTROL MEASURES AT ALL AREAS USED FOR EQUIPMENT STAGING. THE OBJECTIVE OF THESE MEASURES SHALL BE TO PREVENT ANY OFF-SITE SEDIMENT TRACKING DUE TO EQUIPMENT, LOADING OF TRUCKS OR OTHER VEHICLES, ETC.

LEGEND	
PROPERTY LINE	---
APPROXIMATE LIMIT OF DISTURBANCE	- - - - -
TURBIDITY CURTAIN	~~~~~
REINFORCED SILT FENCE
CONSTRUCTION FENCE	□ □ □ □ □
STABILIZED CONSTRUCTION ENTRANCE	▨ ▨ ▨ ▨ ▨
TREE PROTECTION	○ ○ ○ ○ ○
STAGING AND EQUIPMENT STORAGE AREA	▨ ▨ ▨ ▨ ▨
TEMPORARY STOCKPILING	○ ○ ○ ○ ○

Date	Description	No.
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REVISIONS



SIGNATURE: _____ DATE SIGNED: _____
PROFESSIONAL MICHELE O'CONNOR
STATE LIC. NO. 086302

LANGAN
Langan Engineering and
Environmental Services, Inc.
360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project

**2731 WEST 12TH STREET
SWPPP**

BLOCK No. 7247, LOT No. 106
BROOKLYN

KINGS COUNTY NEW YORK

Drawing Title

**EROSION & SEDIMENT
CONTROL PLAN -
PHASE 1**

Project No.

170697301

Date

12/20/2024

Drawn By

MG

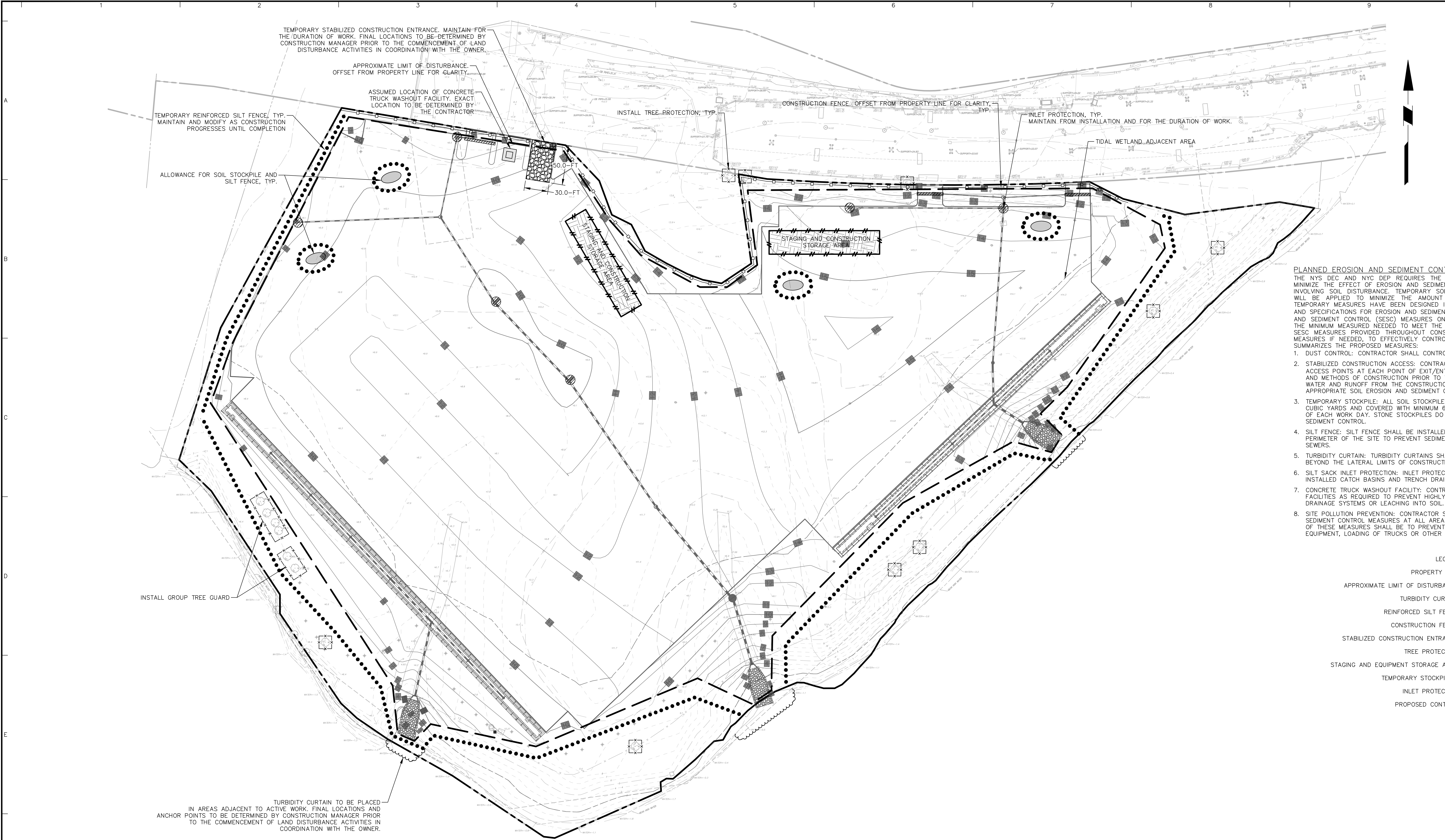
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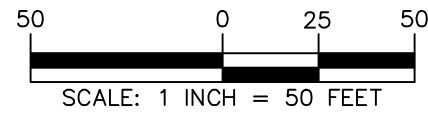
Sheet 6 of 13

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.



EROSION & SEDIMENT CONTROL PLAN - PHASE 2

SCALE: 1" = 50'



NOTES:

- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C.; DATED DECEMBER 20, 2023.
- ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929, (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).

SOIL EROSION AND SEDIMENT CONTROL NOTES:

- THE CONTRACTOR IS RESPONSIBLE FOR ENSURING ALL WORK CONFORMS WITH ALL FEDERAL, STATE, COUNTY OR LOCAL CODES HAVING JURISDICTION OVER SUCH WORK.
- PROCEDURES TO ENSURE PERSONNEL HEALTH AND SAFETY. THE CONTRACTOR MUST MAINTAIN A SAFE AND CLEAN WORKING ENVIRONMENT AND SHALL ENSURE PROPER PERSONAL PROTECTIVE EQUIPMENT IS WORN AT ALL TIMES. IN AREAS WHERE PEDESTRIAN AND/OR VEHICULAR TRAFFIC MAY BE AFFECTED BY THE WORK, THE CONTRACTOR SHALL CORDON OFF THE WORK AREA.
- PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL VISIT THE SITE AND SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UTILITIES, STRUCTURES OR ANY OTHER ELEMENTS WHICH MAY IMPED EROSION AND/OR STRUCTURE RELOCATIONS. IF NECESSARY, SHALL BE COORDINATED THROUGH THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.
- IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY, COORDINATE AND STAGE OR SEQUENCE HIS WORK WITH ANY OTHER PLANNED OR ONGOING CONSTRUCTION ACTIVITIES AT THE SITE.
- THE CONTRACTOR SHALL COORDINATE ANY STAGE WORK, LAY DOWN, AND STORAGE AREA LOCATIONS AND ACCESS WITH OWNER, PRIOR TO START OF WORK.
- ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES ON THIS PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL AND SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITY (PERMIT NO. GP-0-20-001). THESE MEASURES SHALL BE IN INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCE OR IN THE PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.

- CATCH BASINS WITHIN AND DOWNSTREAM OF THE WORK AREA SHALL BE PROTECTED WITH FILTER FABRIC THROUGHOUT THE CONSTRUCTION PERIOD UNTIL THE WORK AREA IS PERMANENTLY STABILIZED.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAINTAINING THE SECURITY OF THE PROJECT SITE DURING ALL WORKING AND NON-WORKING HOURS, SEVEN DAYS A WEEK. CONTRACTOR SHALL PROVIDE A PLAN, WHICH SHALL BE APPROVED BY THE OWNER, SHOWING FENCE LAYOUT, GATE & SIGN LOCATIONS.
- ALL DEBRIS CREATED BY THE CONTRACTOR IN THE IMMEDIATE VICINITY OF WORK SHALL BE RECOVERED AND PROPERLY DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER
- ALL CONSTRUCTION VEHICLES HAULING MATERIALS EITHER INTO OR OUT OF THE CONSTRUCTION AREA SHALL HAVE A SECURED TARP OVER MATERIALS TO PREVENT SEDIMENT POLLUTION OF PUBLIC ROADWAYS.
- IF REQUIRED, THE CONTRACTOR SHALL REQUEST WRITTEN APPROVAL FROM THE OWNER'S REPRESENTATIVE FOR TEMPORARY SHUTDOWN OF UTILITIES, A MINIMUM OF THREE WORKING DAYS IN ADVANCE.
- ALL SITE EROSION AND SEDIMENT CONTROL (SESC) MEASURES SHOWN ON THE PLANS ARE MINIMUM MEASURES REQUIRED. THE SOIL EROSION NEEDS WILL VARY THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE INCREASE SESC MEASURES AND CONTROLS, IN ACCORDANCE WITH NYSDEC STANDARDS, AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEMS OR THE SURROUNDING WATERBODIES DURING CONSTRUCTION. THE OWNER, NYSDEC, NYCDEP, OR THE ARCHITECT MAY REQUEST ADDITIONAL MEASURES AND CONTROLS TO MINIMIZE THE POTENTIAL FOR ONSITE OR OFFSITE PROBLEMS THAT MAY OCCUR DURING CONSTRUCTION.
- ANY LAND DISTURBED AND EXPOSED FOR MORE THAN 7 DAYS AND NOT IN ACTIVE USE SHALL BE SEEDED. SHOULD THE SEASON PREVENT THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS SHALL BE MULCHED WITH STRAW OR APPROVED EQUIVALENT. THE SEEDING SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR TEMPORARY SEEDING.
- CONTRACTOR SHALL IMMEDIATELY STABILIZE AREAS WHERE SLOPES ARE GREATER THAN 3 TO 1.
- PAVED ROADWAYS AND CONSTRUCTION ACCESS POINTS SHALL BE MAINTAINED IN A CLEAN STATE AT ALL TIMES.

- THE SITE SHALL BE GRADED AND MAINTAINED TO DIVERT ALL STORMWATER RUNOFF TOWARDS SOIL EROSION AND SEDIMENT CONTROL MEASURES.
- THE CONTRACTOR SHALL IMPLEMENT DUST CONTROL MEASURES DURING CONSTRUCTION. THE CONTRACTOR IS TO MINIMIZE DUST CLOUDS BY SPRINKLING CONSTRUCTION AREA WITH POTABLE WATER OR OTHER NYSDEC APPROVED METHODS. MAINTAIN DUST CONTROL MEASURES THROUGH DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS ARE STABILIZED.
- CONTRACTOR SHALL OBSERVE FUNCTION AND ADEQUACY OF SESC MEASURES DURING INSPECTIONS OCCURRING A MINIMUM OF ONCE PER WEEK AND IF THOSE ARE NOT SUFFICIENT, ADDITIONAL SOIL EROSION MEASURES SHALL BE IMPLEMENTED.
- ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL FINAL ACCEPTANCE OF THE WORK BY THE OWNER UPON CERTIFICATION OF FINAL ACCEPTANCE. THE OWNER SHALL ASSUME RESPONSIBILITY FOR THE CONTINUED MAINTENANCE OF PERMANENT SOIL EROSION AND SEDIMENT CONTROL MEASURES.

CONSTRUCTION PROGRAM:

- FLAG THE WORK LIMITS AND ITEMS TO BE PROTECTED (I.E. TREES)
- INSTALL SILT FENCE AND CONSTRUCTION BARRIERS AS NEEDED.
- COMPLETE SITE REMOVALS FOR THE SITE AS NEEDED.
- REMOVE EROSION CONTROL ITEMS WHEN EARTHWORK IS COMPLETE AND ALL PERMANENT SURFACES ARE IN PLACE AND ESTABLISHED.
- KEEP AREAS BEYOND SITE IN CLEAN, CLEAR CONDITION DURING COURSE OF WORK.

MAINTENANCE NOTES:

- FINAL CONSTRUCTION SEQUENCING AND STAGING PLANS SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO THE START OF CONSTRUCTION.
- THE SITE CONTRACTOR WILL BE RESPONSIBLE FOR THE PROPER CONSTRUCTION AND MAINTENANCE OF ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES AND RELATED ITEMS INCLUDED WITHIN THIS PLAN. THE SITE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR THE PROPER CONSTRUCTION AND STABILIZATION OF PERMANENT CONTROL MEASURES AND RELATED ITEMS INCLUDED WITHIN THIS PLAN THROUGH COMPLETION OF CONSTRUCTION.

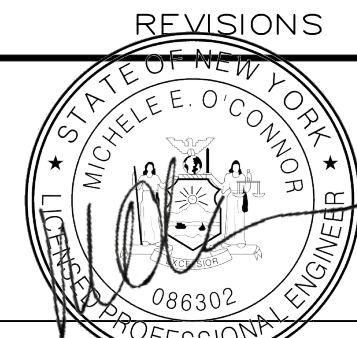
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 - TURBIDITY CURTAIN: TURBIDITY CURTAINS SHALL BE INSTALLED WITHIN THE WATERBODY BEYOND THE LATERAL LIMITS OF CONSTRUCTION SITE AND FIRMLY ANCHORED IN PLACE.
 - SILT SACK INLET PROTECTION: INLET PROTECTION WILL BE INSTALLED IN ALL NEWLY INSTALLED CATCH BASINS AND TRENCH DRAINS LOCATED WITHIN THE LIMIT OF DISTURBANCE.
 - CONCRETE TRUCK WASHOUT FACILITY: CONTRACTOR SHALL INSTALL CONCRETE WASHOUT FACILITIES AS REQUIRED TO PREVENT HIGHLY ALKALINE RUNOFF FROM ENTERING STORM DRAINAGE SYSTEMS OR LEACHING INTO SOIL.
 - SITE POLLUTION PREVENTION: CONTRACTOR SHALL INSTALL STANDARD SOIL EROSION AND SEDIMENT CONTROL MEASURES AT ALL AREAS USED FOR EQUIPMENT STAGING. THE OBJECTIVE OF THESE MEASURES SHALL BE TO PREVENT ANY OFF-SITE SEDIMENT TRACKING DUE TO EQUIPMENT, LOADING OF TRUCKS OR OTHER VEHICLES, ETC.

LEGEND

- PROPERTY LINE
APPROXIMATE LIMIT OF DISTURBANCE
TURBIDITY CURTAIN
REINFORCED SILT FENCE
CONSTRUCTION FENCE
STABILIZED CONSTRUCTION ENTRANCE
TREE PROTECTION
STAGING AND EQUIPMENT STORAGE AREA
TEMPORARY STOCKPILING
INLET PROTECTION
PROPOSED CONTOUR

Date	Description	No.
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SIGNATURE: PROFESSIONAL MICHELE O'CONNOR
DATE SIGNED: STATE LIC. No. 086302

LANGAN
Langan Engineering and
Environmental Services, Inc.
360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
**2731 WEST 12TH STREET
SWPPP**

BLOCK No. 7247, LOT No. 106
BROOKLYN

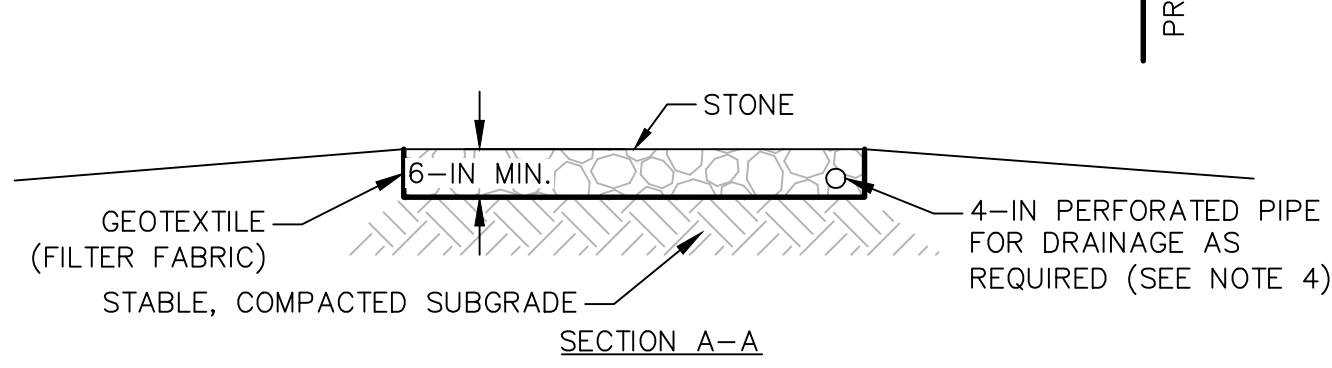
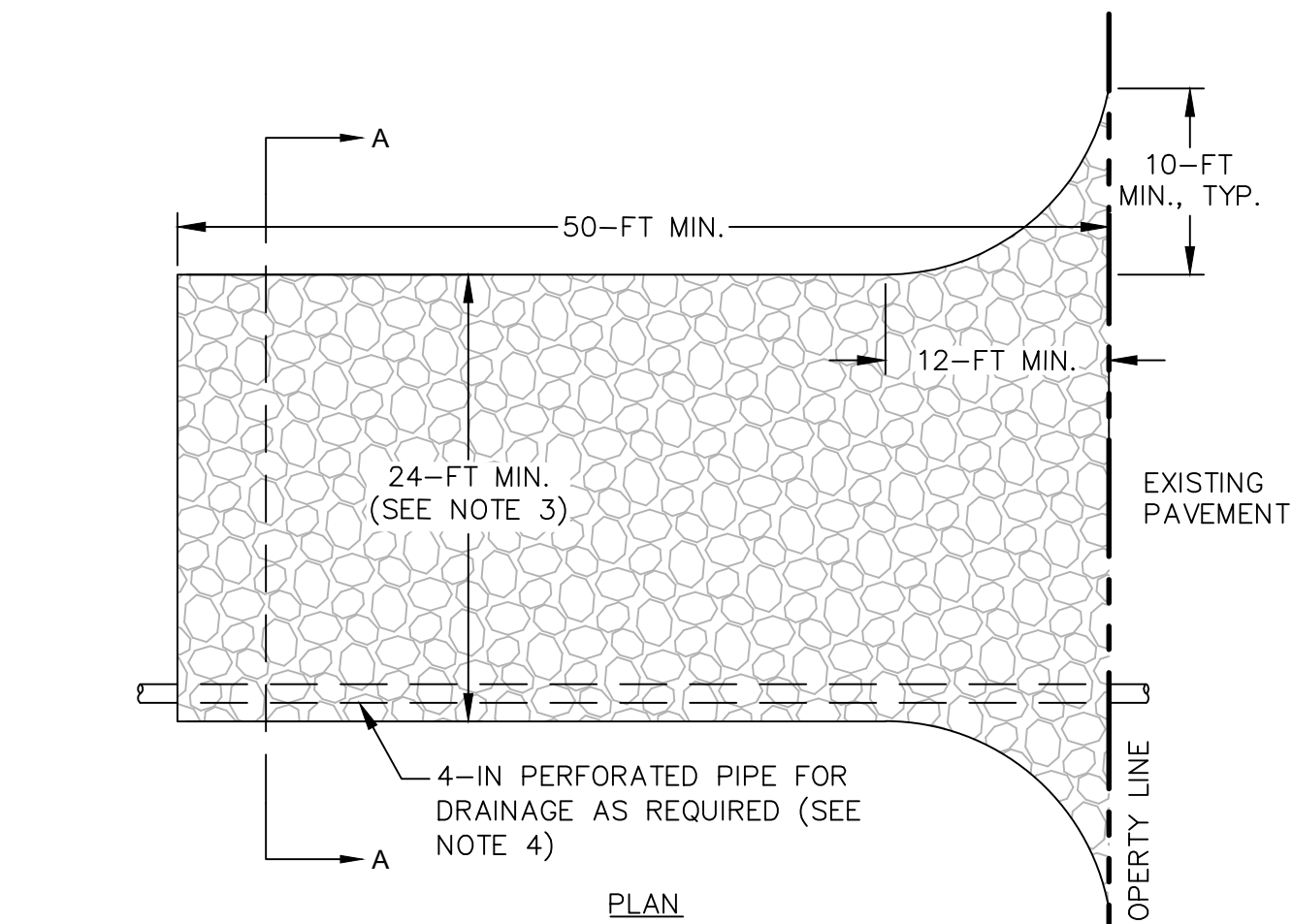
KINGS COUNTY NEW YORK

Drawing Title

**EROSION & SEDIMENT
CONTROL PLAN -
PHASE 2**

Project No. 170697301	Drawing No. C-101
Date 12/20/2024	Drawn By MG
Checked By BC	Sheet 7 of 13

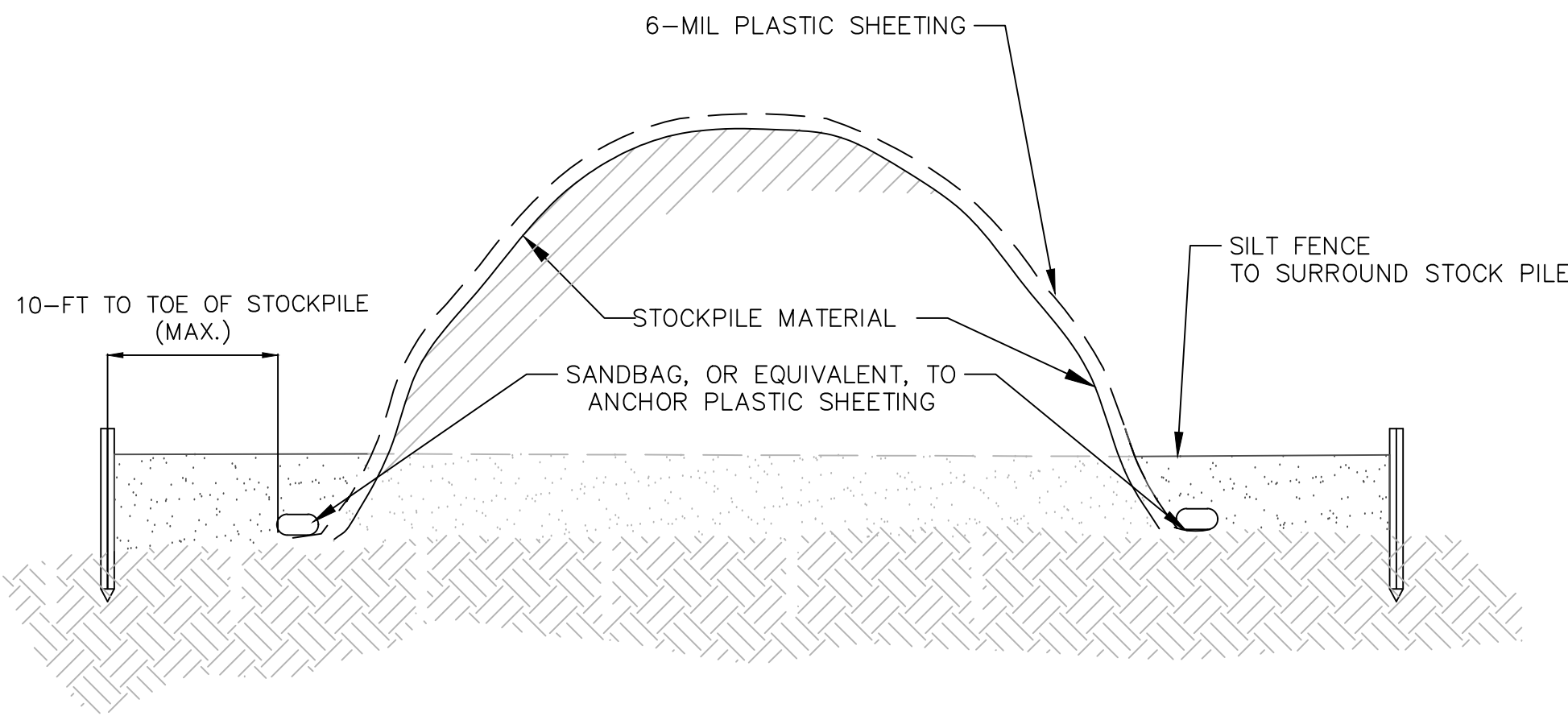
WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, OTHER THAN AN ARCHITECT, ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.



- NOTES:**
1. GEOTEXTILE: PLACE OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
 2. STONE SIZE: SHALL BE ASTM C-33 SIZE No. 1 OR 2. RECYCLED CONCRETE AGGREGATE IS NOT ACCEPTABLE.
 3. WIDTH: SHALL BE 24-FT, UNLESS THERE ARE MULTIPLE ENTRANCES TO THE SITE, WHERE THE MINIMUM WIDTH SHALL THEN BE 12-FT.
 4. SURFACE RUNOFF: SLOPE ALL DRAINAGE AWAY FROM CONSTRUCTION ENTRANCE. IF SURFACE RUNOFF MUST BE SLOPED TOWARD CONSTRUCTION ENTRANCES IT SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
 5. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY AND DISPOSED OF PROPERLY.
 6. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
 7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
 8. LOCATION OF TRUCK CLEANING PAD TO BE DETERMINED BY CONTRACTOR IN FIELD WITH OWNER APPROVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELATED PERMITS.

1 STABILIZED CONSTRUCTION ENTRANCE

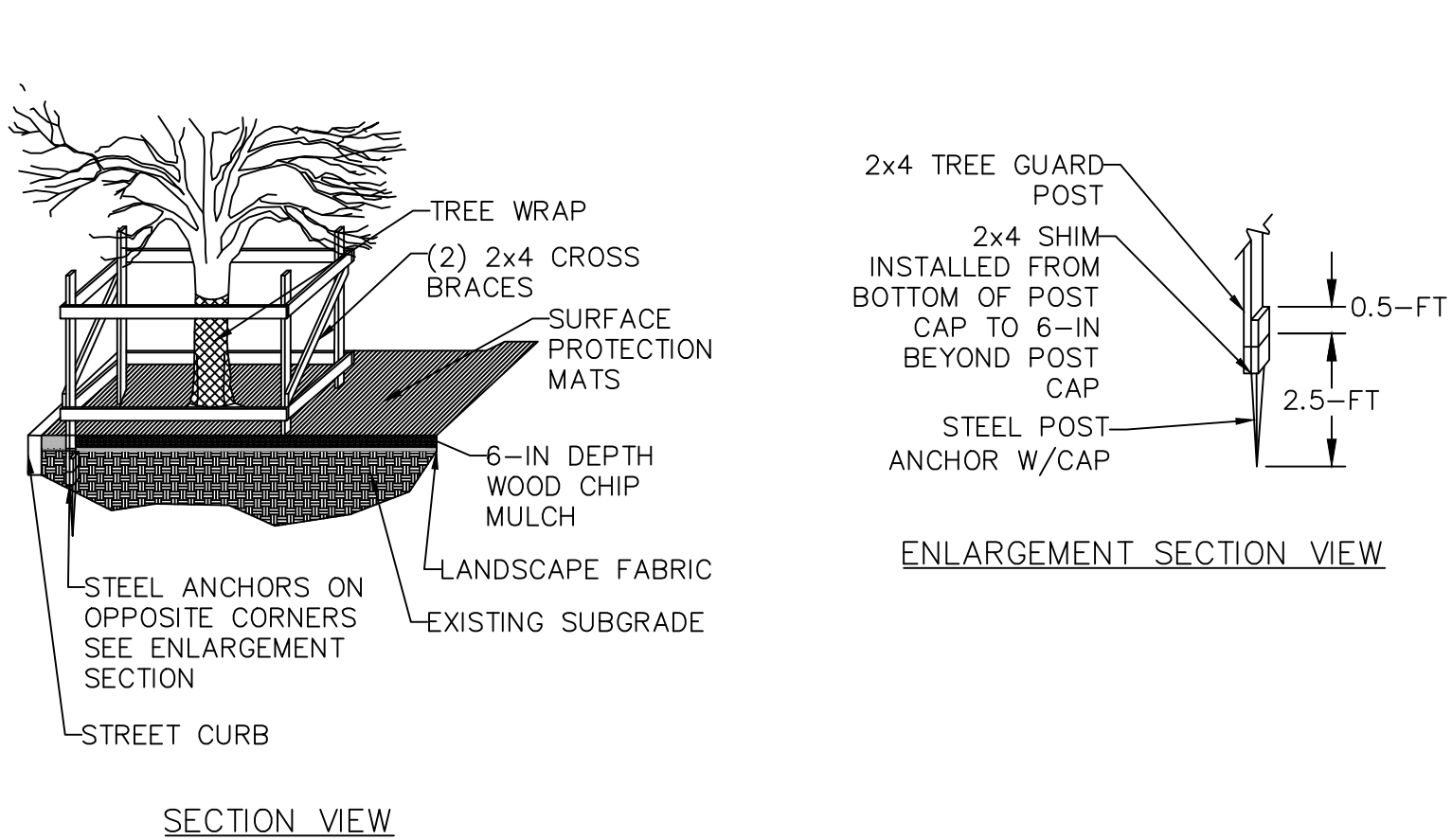
NTS



- NOTES:**
1. SOIL STOCKPILES SHALL BE LIMITED TO 1,000-CY IN SIZE.
 2. SOIL STOCKPILES SHALL BE COVERED WITH 6-MIL PLASTIC SHEETING OR TARP AT THE END OF EACH WORK DAY.
 3. STOCKPILES MUST BE 50-FT FROM SLOPE, ROADWAY, STREAMS, WETLANDS, AND DRAINAGE FACILITIES.
 4. SILT FENCE NOT TO EXCEED 10-FT FROM TOE OF STOCKPILE

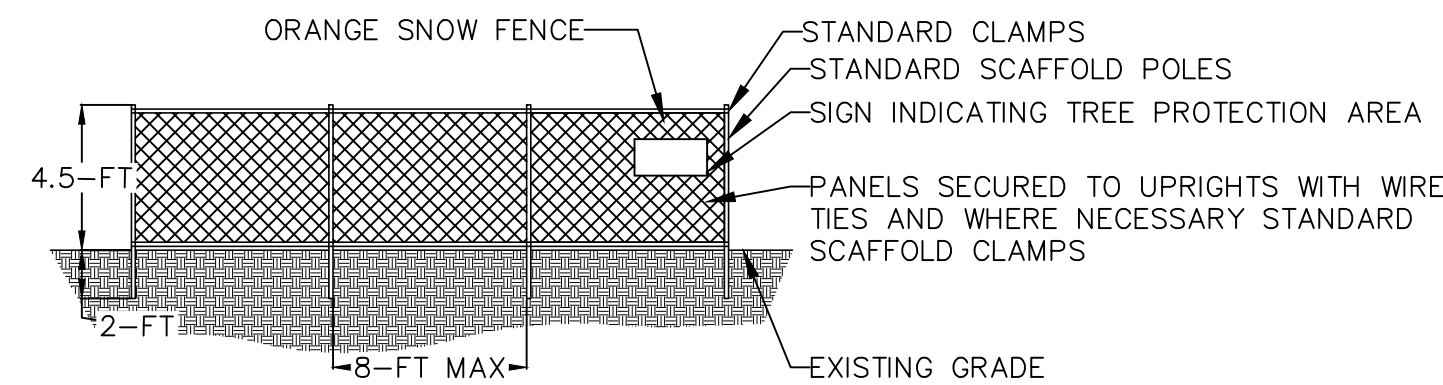
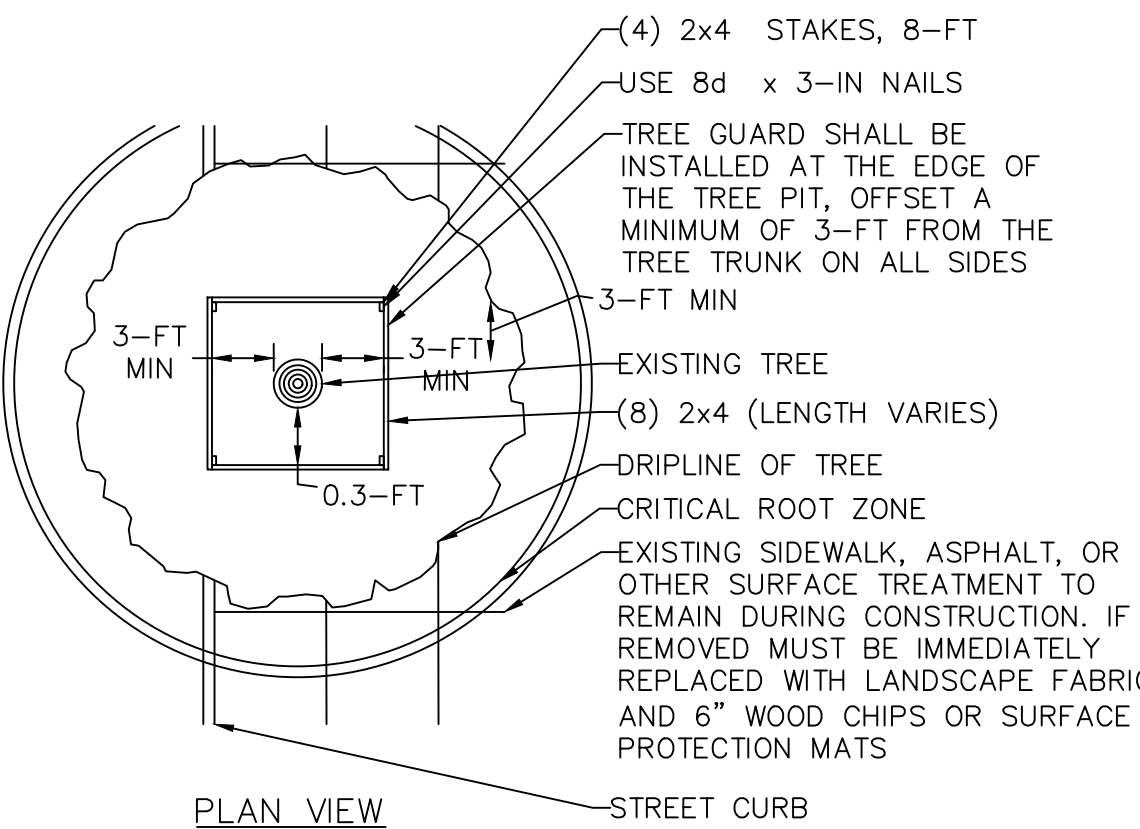
2 TEMPORARY STOCKPILING WITH REINFORCED SILT FENCE

NTS



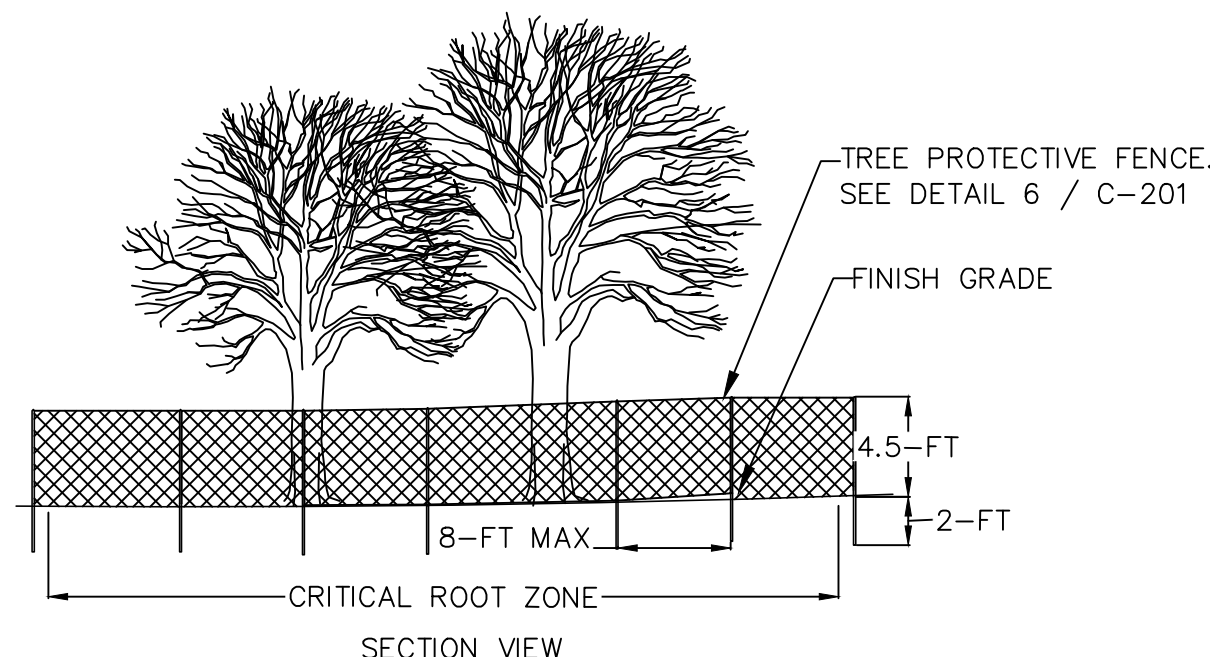
5 TREE PROTECTION - TREE GUARD WITH CRITICAL ROOT ZONE GROUND PROTECTION

NTS



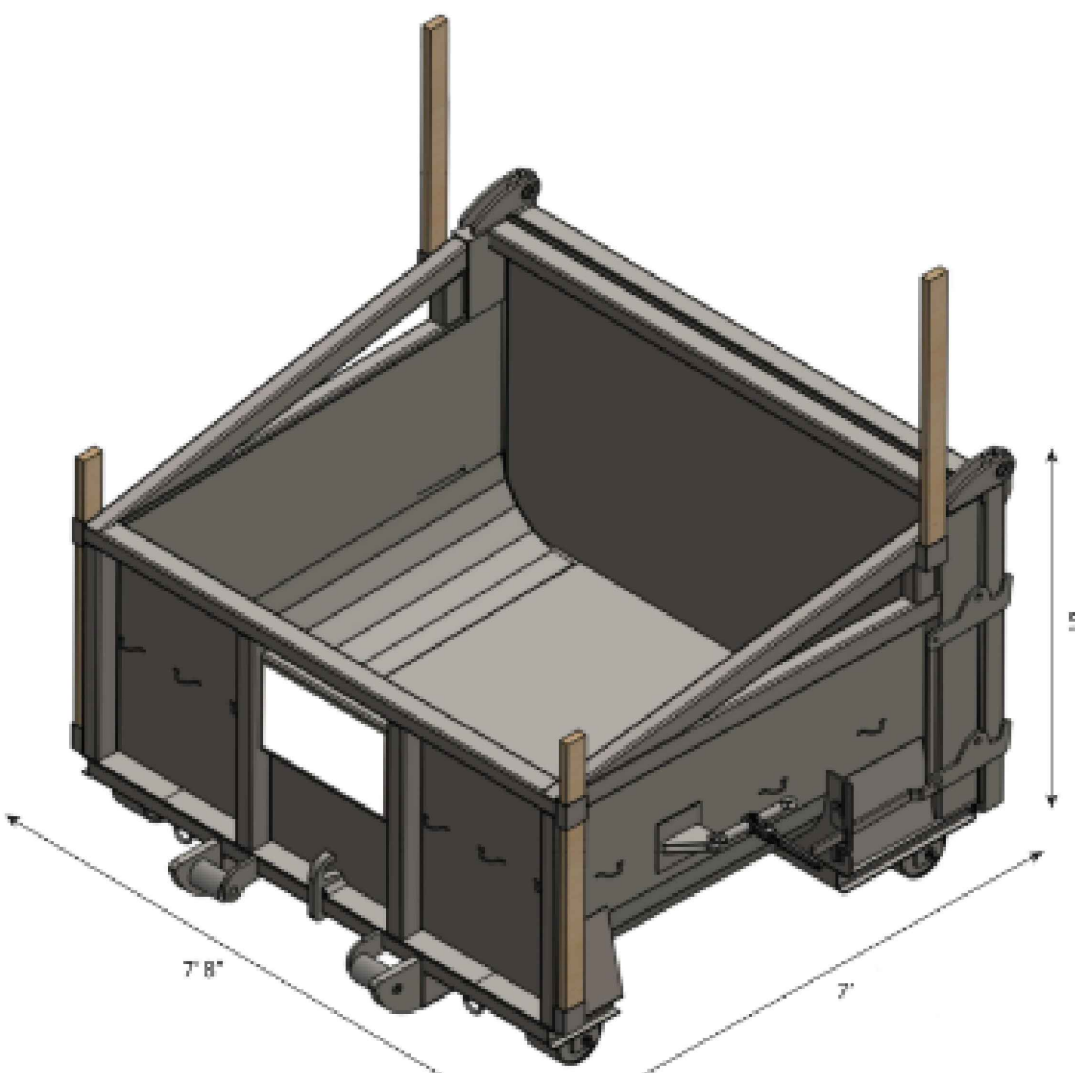
6 TREE PROTECTIVE FENCE

NTS



7 GROUP TREE GUARD

NTS

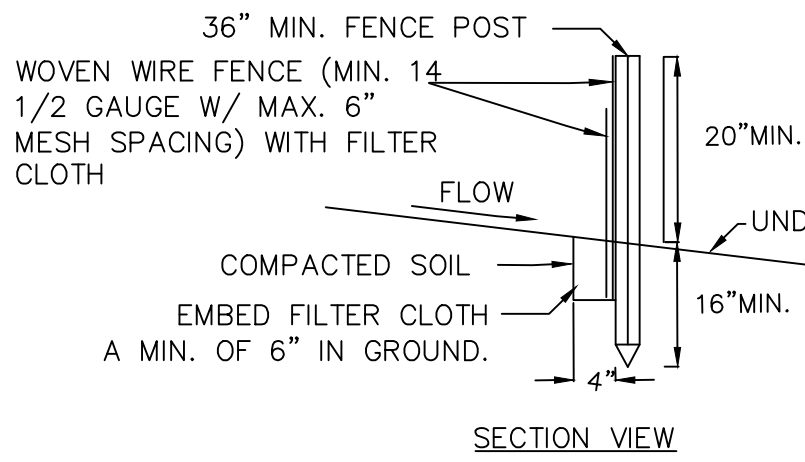
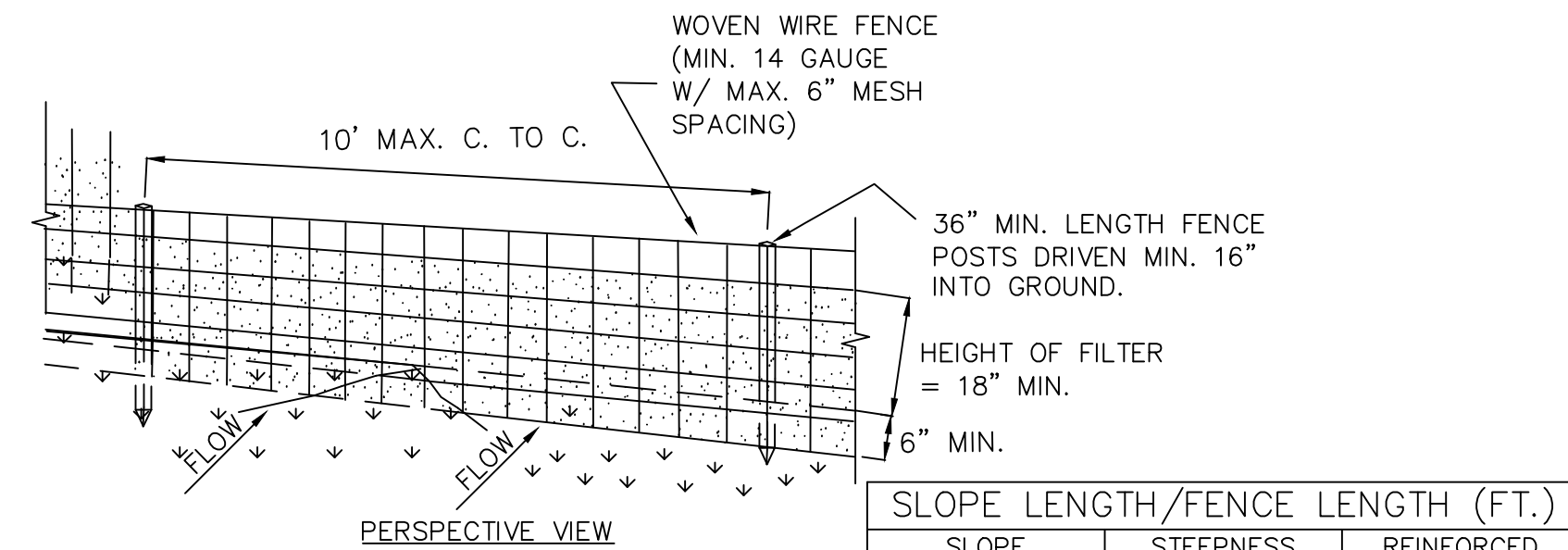


Volume Capacity: 6 Cubic Yard
Weight: 2,650 lbs
Max Loaded Weight: 24,000 lbs
Dimensions: L-7' x W-7'8" x H-5'
Front Nose Roller: 12"
Back Main Rails Ext: 4"

- NOTES:**
1. PROVIDE SIGNAGE TO DIRECT DRIVERS TO FACILITY AFTER THEIR LOAD IS DISCHARGED.
 2. MAINTENANCE: CONCRETE TRUCK WASHOUT FACILITY SHALL BE INSPECTED DAILY FOR DAMAGE OR LEAKING. ALL CONCRETE WASHOUT WATER SHALL BE COLLECTED AND CONTAINED IN OR ON THE CONCRETE MIXER TRUCK OR IN PRE-MANUFACTURED WATERTIGHT CONTAINERS SPECIFICALLY DESIGNED AND FABRICATED TO COLLECT AND CONTAIN CONCRETE WASHOUT WATER ON-SITE.

8 CONCRETE TRUCK WASHOUT FACILITY

NTS



SLOPE	STEEPNESS	REINFORCED
<2%	>50:1	N/A
2-10%	50:1 TO 10:1	250/2000
10-20%	10:1 TO 5:1	150/1000
20-33%	5:1 TO 3:1	80/750
33-50%	3:1 TO 2:1	70/350
>50%	2:1	30/175

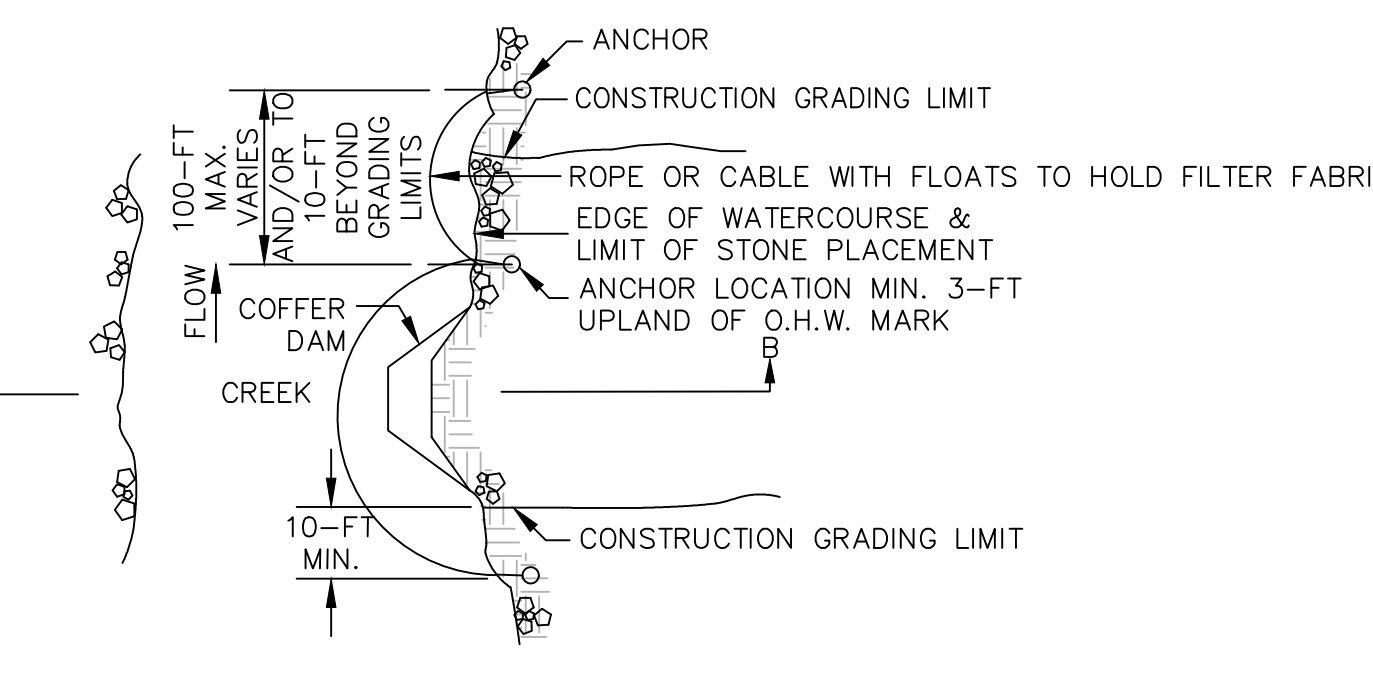
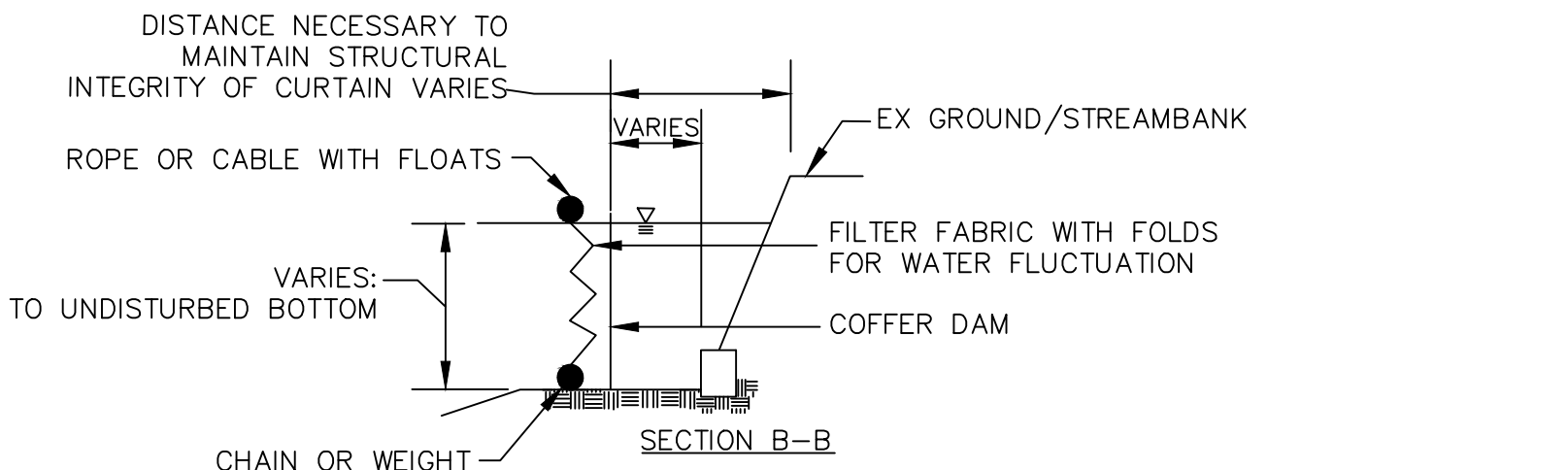
CRITERIA FOR SILT FENCE FABRIC		
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

- CONSTRUCTION SPECIFICATIONS**
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE.
 2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
 3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
 4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.
 5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE REINFORCED SILT FENCE.

ADAPTED FROM NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL

3 REINFORCED SILT FENCE

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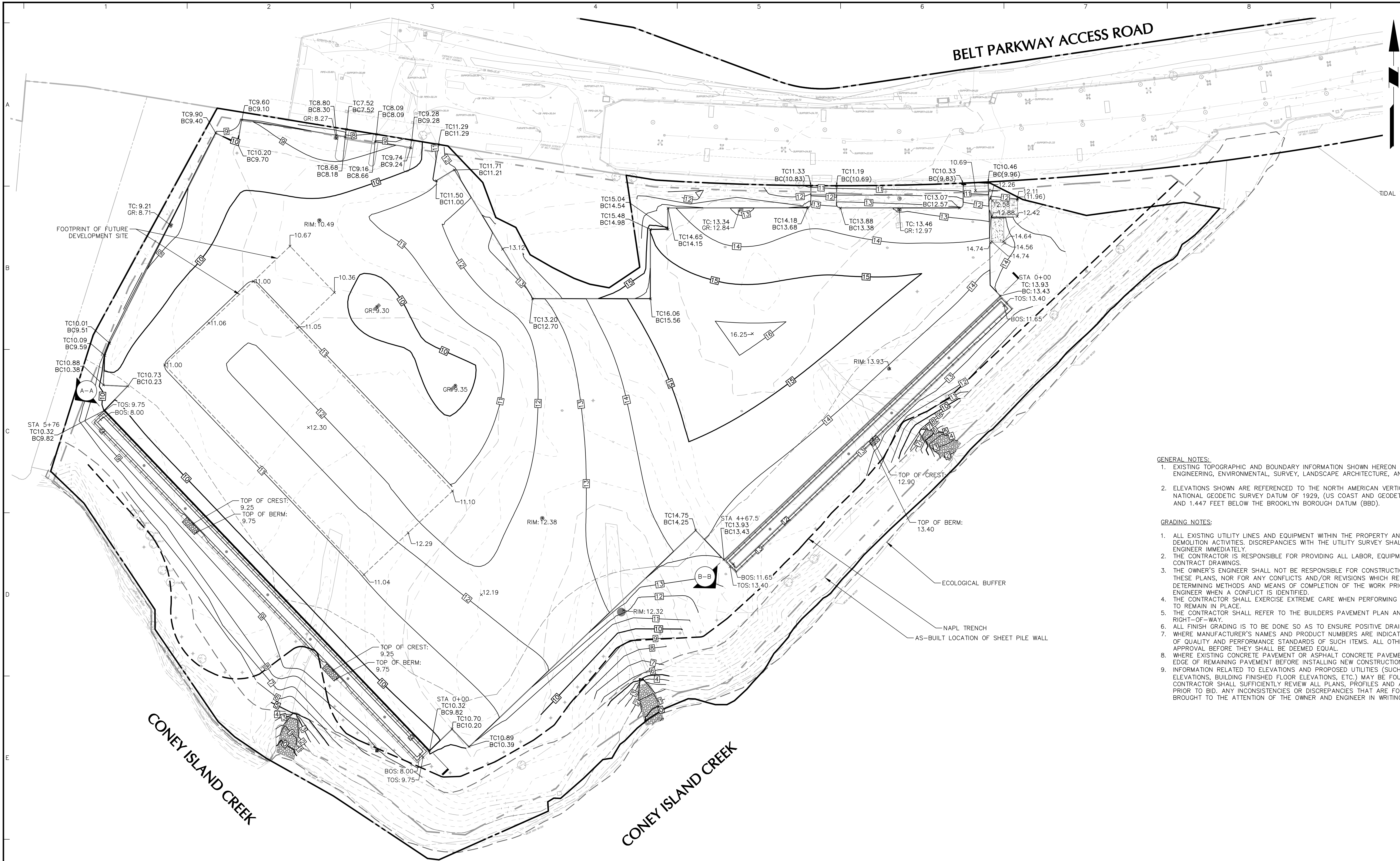
ADAPTED FROM NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL

4 TURBIDITY CURTAIN

NTS

Date	Description	No.
SIGNATURE: _____ DATE SIGNED: _____ PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project: 2731 WEST 12TH STREET SWPPP BLOCK No. 7247, LOT No. 106 BROOKLYN KINGS COUNTY NEW YORK		
Drawing Title: EROSION & SEDIMENT CONTROL DETAILS		
Project No.	Drawing No.	
170697301	C-201	
Date	12/20/2024	
Drawn By	MG	
Checked By	BC	
		Sheet 8 of 13

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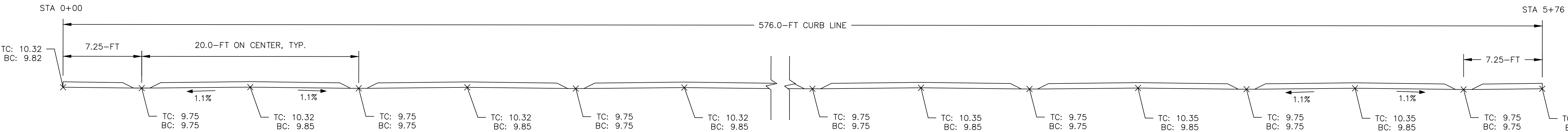
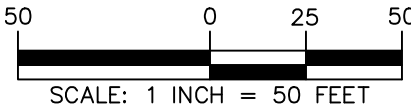


LEGEND	
PROPERTY LINE	---
AS-BUILT SHEET PILE WALL	- - - -
NAPL TRENCH	- - - -
TIDAL WETLAND ADJACENT AREA (TWAA)	- - - -
ECOLOGICAL BUFFER	- - - -
PROPOSED ELEVATION	✓(XX.XX)
EXISTING ELEVATION	✓XX.XX
GRATE ELEVATION	✓GR: XX.XX
RIM ELEVATION	✓RIM: XX.XX
TOP/BOTTOM OF CURB ELEVATION	✓TCXX.XX ✓BCXX.XX
TOP OF SLOPE ELEVATION	✓TOS: XX.XX
BOTTOM OF SLOPE ELEVATION	✓BOS: XX.XX
CONTOUR LINE	---x---

- GENERAL NOTES:
- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON AS PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE, AND GEOLOGY, D.P.C., DATED OCTOBER 26, 2022.
 - ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929. (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).

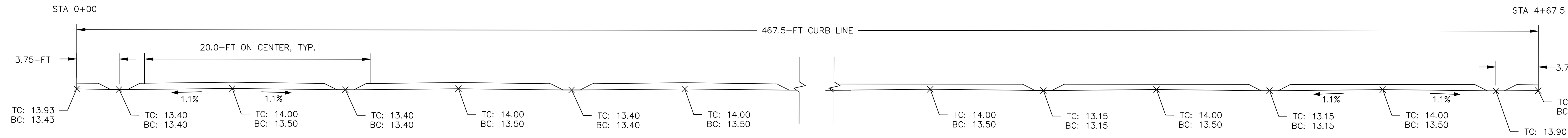
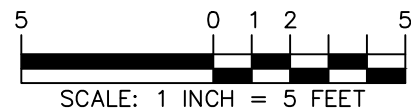
- GRADING NOTES:
- ALL EXISTING UTILITY LINES AND EQUIPMENT WITHIN THE PROPERTY AND LIMIT OF WORK SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION ACTIVITIES. DISCREPANCIES WITH THE UTILITY SURVEY SHALL BE IDENTIFIED. CONTRACTOR SHALL NOTIFY THE MEP AND CIVIL ENGINEER IMMEDIATELY.
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR, EQUIPMENT, AND MATERIALS AS REQUIRED FOR THE WORK SHOWN ON THE CONTRACT DRAWINGS.
 - THE OWNER'S ENGINEER SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION METHODS AND MEANS FOR COMPLETION OF THE WORK DEPICTED ON THESE PLANS, NOR FOR ANY CONFLICTS AND/OR REVISIONS WHICH RESULT FROM THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING METHODS AND MEANS OF COMPLETION OF THE WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND NOTIFY THE OWNER'S ENGINEER WHEN A CONFLICT IS IDENTIFIED.
 - THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN PERFORMING ANY WORK ACTIVITIES ADJACENT TO EXISTING WALLS AND BUILDING WALLS TO REMAIN IN PLACE.
 - THE CONTRACTOR SHALL REFER TO THE BUILDERS PAVEMENT PLAN AND SCARA FOR SIDEWALK, CURB AND ROADWAY WORK WITHIN THE RIGHT-OF-WAY.
 - ALL FINISH GRADING IS TO BE DONE SO AS TO ENSURE POSITIVE DRAINAGE TOWARD THE APPROPRIATE DRAINAGE STRUCTURES.
 - WHERE MANUFACTURER'S NAMES AND PRODUCT NUMBERS ARE INDICATED ON DRAWINGS, IT SHALL BE CONSTRUED TO MEAN THE ESTABLISHMENT OF QUALITY AND PERFORMANCE STANDARDS OF SUCH ITEMS. ALL OTHER PRODUCTS MUST BE SUBMITTED TO THE OWNER'S ENGINEER FOR APPROVAL BEFORE THEY SHALL BE DEEMED EQUAL.
 - WHERE EXISTING CONCRETE PAVEMENT OR ASPHALT CONCRETE PAVEMENT ARE REMOVED, THE CONTRACTOR SHALL SAWCUT AND NEATLY TRIM EDGE OF REMAINING PAVEMENT BEFORE INSTALLING NEW CONSTRUCTION.
 - INFORMATION RELATED TO ELEVATIONS AND PROPOSED UTILITIES (SUCH AS ROADWAY GRADES, INVERT ELEVATIONS, RIM ELEVATIONS, GRATE ELEVATIONS, BUILDING FINISHED FLOOR ELEVATIONS, ETC.) MAY BE FOUND IN MORE THAN ONE LOCATION IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL SUFFICIENTLY REVIEW ALL PLANS, PROFILES AND ANY OTHER INFORMATION IN THE CONTRACT DOCUMENTS FOR CONSISTENCY PRIOR TO BID. ANY INCONSISTENCIES OR DISCREPANCIES THAT ARE FOUND BY THE CONTRACTOR OR HIS ASSIGNS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER IN WRITING, IN THE FORMAT OF AN RFI PRIOR TO BID.

GRADING PLAN
SCALE: 1" = 50'



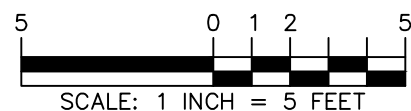
SECTION A-A
SCALE: 1" = 5'

NOTE: REFER TO DETAIL 3 ON C-501 FOR CURB OPENING DETAIL.



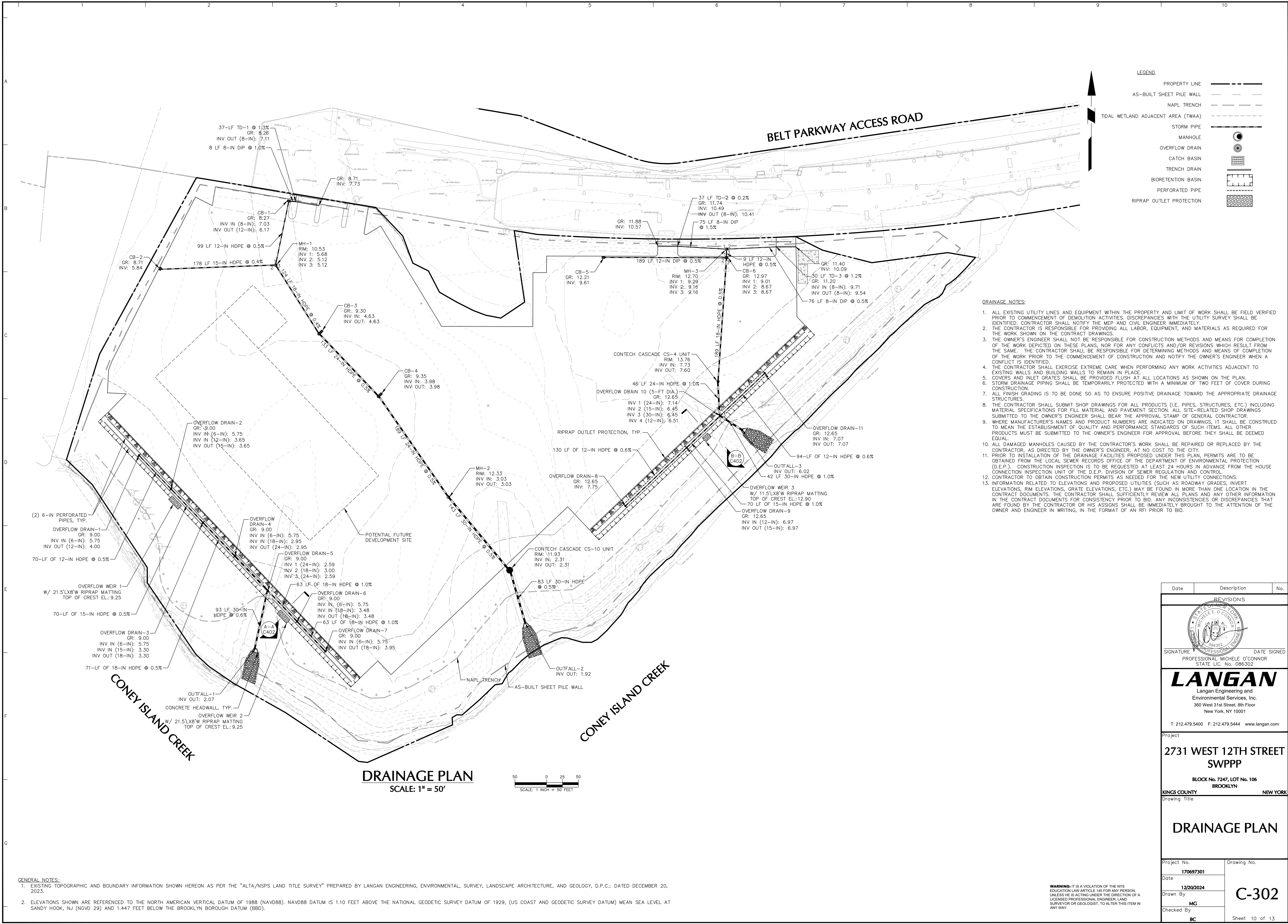
SECTION B-B
SCALE: 1" = 5'

NOTE: REFER TO DETAIL 3 ON C-501 FOR CURB OPENING DETAIL.



WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		
SIGNATURE PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		DATE SIGNED
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project 2731 WEST 12TH STREET SWPPP BLOCK No. 7247, LOT No. 106 BROOKLYN KINGS COUNTY NEW YORK		
Drawing Title GRADING PLAN		
Project No. 170697301	Drawing No. C-301	
Date 12/20/2024	Drawn By MG	
Checked By BC	Sheet 9 of 13	



LEGEND

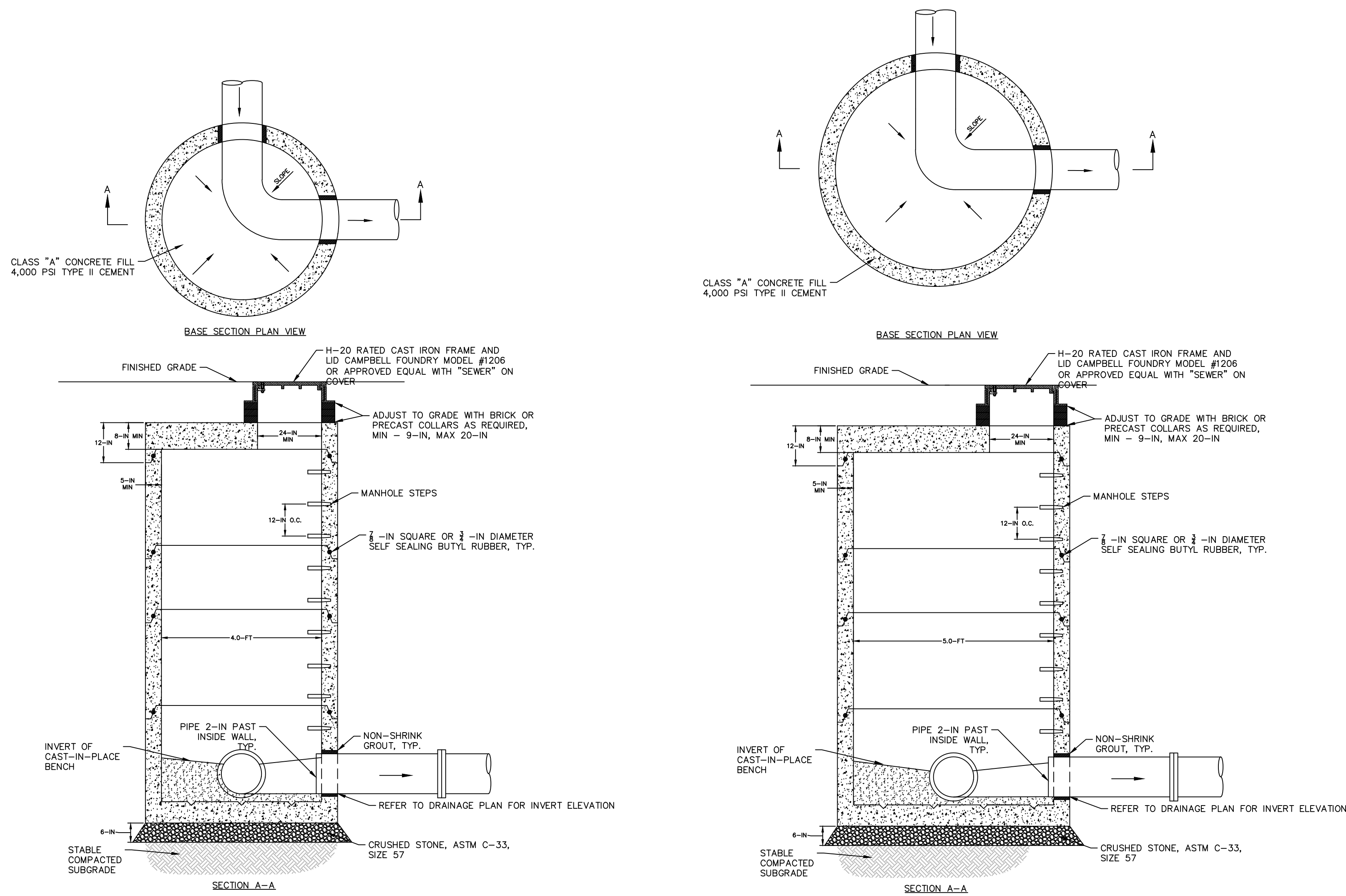
- PROPERTY LINE
- AS-BUILT SHEET PILE WALL
- NAPL TRENCH
- TIDAL WETLAND ADJACENT AREA (TWAA)
- STORM PIPE
- MANHOLE
- OVERFLOW DRAIN
- CATCH BASIN
- TRENCH DRAIN
- BIORETENTION BASIN
- PERFORATED PIPE
- RIPRAP OUTLET PROTECTION

- DRAINAGE NOTES:**
- ALL EXISTING UTILITY LINES AND EQUIPMENT WITHIN THE PROPERTY AND LIMIT OF WORK SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF DEMOLITION ACTIVITIES. DISCREPANCIES WITH THE UTILITY SURVEY SHALL BE IDENTIFIED. CONTRACTOR SHALL NOTIFY THE MEP AND CIVIL ENGINEER IMMEDIATELY.
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR, EQUIPMENT, AND MATERIALS AS REQUIRED FOR THE WORK SHOWN ON THE CONTRACT DRAWINGS.
 - THE OWNER'S ENGINEER SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION METHODS AND MEANS FOR COMPLETION OF THE WORK DEPICTED ON THESE PLANS, NOR FOR ANY CONFLICTS AND/OR REVISIONS WHICH RESULT FROM THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING METHODS AND MEANS OF COMPLETION OF THE WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND NOTIFY THE OWNER'S ENGINEER WHEN A CONFLICT IS IDENTIFIED.
 - THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN PERFORMING ANY WORK ACTIVITIES ADJACENT TO EXISTING WALLS AND BUILDING WALLS TO REMAIN IN PLACE.
 - COVERS AND INLET GRATES SHALL BE PROVIDED FLUSH AT ALL LOCATIONS AS SHOWN ON THE PLAN.
 - STORM DRAINAGE PIPING SHALL BE TEMPORARILY PROTECTED WITH A MINIMUM OF TWO FEET OF COVER DURING CONSTRUCTION.
 - ALL FINISH GRADING IS TO BE DONE SO AS TO ENSURE POSITIVE DRAINAGE TOWARD THE APPROPRIATE DRAINAGE STRUCTURES.
 - THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL PRODUCTS (I.E. PIPES, STRUCTURES, ETC.) INCLUDING MATERIAL SPECIFICATIONS FOR FILL MATERIAL AND PAVEMENT SECTION. ALL SITE-RELATED SHOP DRAWINGS SUBMITTED TO THE OWNER'S ENGINEER SHALL BEAR THE APPROVAL STAMP OF GENERAL CONTRACTOR.
 - WHERE MANUFACTURER'S NAMES AND PRODUCT NUMBERS ARE INDICATED ON DRAWINGS, IT SHALL BE CONSTRUED TO MEAN THE ESTABLISHMENT OF QUALITY AND PERFORMANCE STANDARDS OF SUCH ITEMS. ALL OTHER PRODUCTS MUST BE SUBMITTED TO THE OWNER'S ENGINEER FOR APPROVAL BEFORE THEY SHALL BE DEEMED EQUAL.
 - ALL DAMAGED MANHOLES CAUSED BY THE CONTRACTOR'S WORK SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS DIRECTED BY THE OWNER'S ENGINEER, AT NO COST TO THE CITY.
 - PRIOR TO INSTALLATION OF THE DRAINAGE FACILITIES PROPOSED UNDER THIS PLAN, PERMITS ARE TO BE OBTAINED FROM THE LOCAL SEWER RECORDS OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (D.E.P.). CONSTRUCTION INSPECTION IS TO BE REQUESTED AT LEAST 24 HOURS IN ADVANCE FROM THE HOUSE CONNECTION INSPECTION UNIT OF THE D.E.P. DIVISION OF SEWER REGULATION AND CONTROL.
 - CONTRACTOR TO OBTAIN CONSTRUCTION PERMITS AS NEEDED FOR THE NEW UTILITY CONNECTIONS.
 - INFORMATION RELATED TO ELEVATIONS AND PROPOSED UTILITIES (SUCH AS ROADWAY GRADES, INVERT ELEVATIONS, RIM ELEVATIONS, GRATE ELEVATIONS, ETC.) MAY BE FOUND IN MORE THAN ONE LOCATION IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL SUFFICIENTLY REVIEW ALL PLANS AND ANY OTHER INFORMATION IN THE CONTRACT DOCUMENTS FOR CONSISTENCY PRIOR TO BID. ANY INCONSISTENCIES OR DISCREPANCIES THAT ARE FOUND BY THE CONTRACTOR OR HIS ASSIGNS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER IN WRITING, IN THE FORMAT OF AN RFI PRIOR TO BID.

- GENERAL NOTES:**
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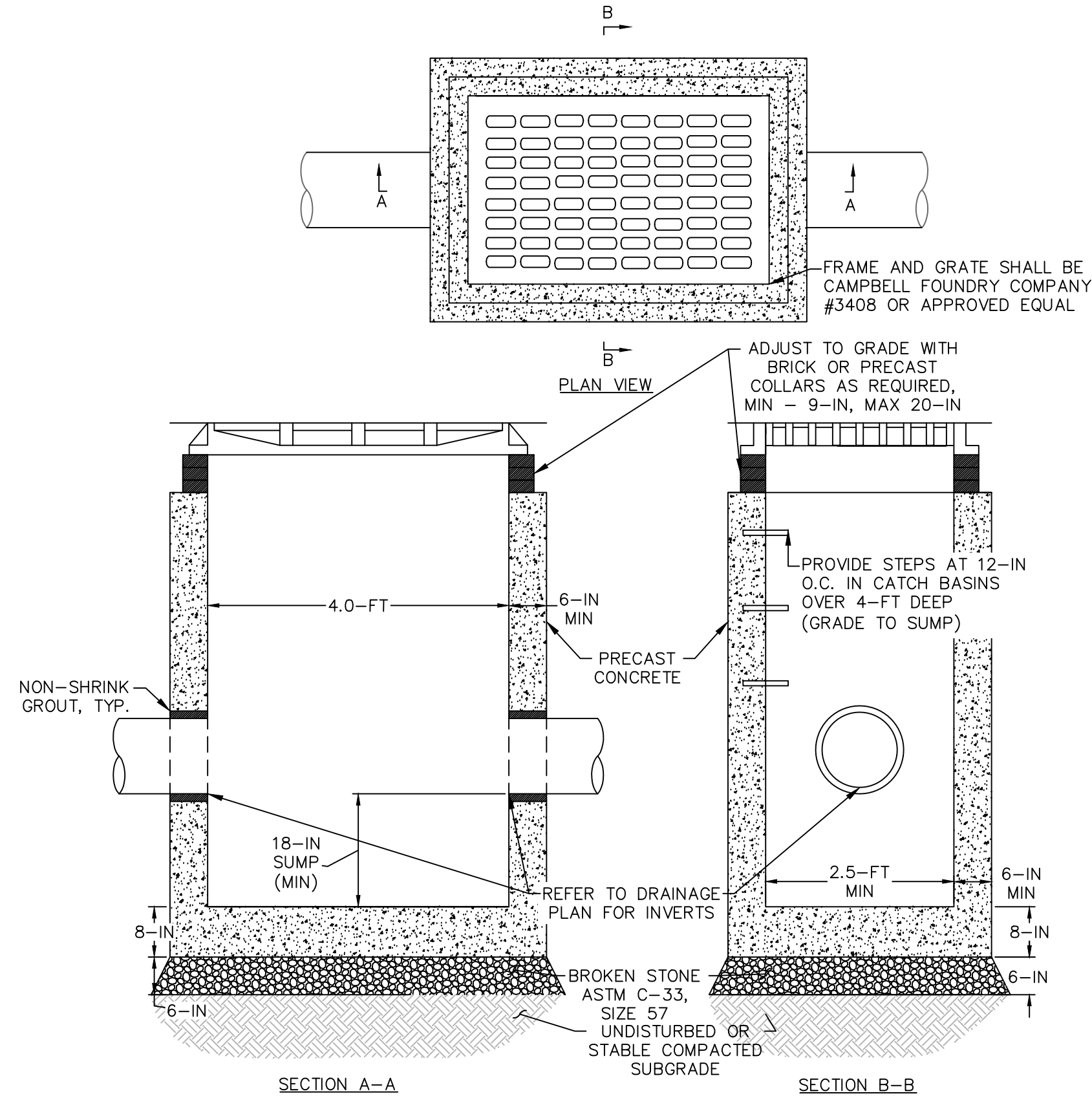
Date	Description	No.
REVISIONS		
SIGNATURE		DATE SIGNED
PROFESSIONAL MICHELE O'CONNOR		
STATE LIC. No. 086302		
LANGAN		
Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001		
T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project		
2731 WEST 12TH STREET SWPPP		
BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY		
Drawing Title		
DRAINAGE PLAN		
Project No.		Drawing No.
170697301		
Date		
12/20/2024		
Drawn By		
MG		
Checked By		
BC		
		C-302
		Sheet 10 of 13



- NOTES:
1. ALL MANHOLES SECTIONS SHALL CONFORM TO ASTM C-478, LATEST REVISION STANDARD SPECIFICATIONS FOR PRECAST REINFORCED MANHOLE SECTIONS.
 2. MANHOLE RISER SECTIONS TO BE FURNISHED IN 1, 2, 3 OR 4-FT HEIGHTS AS REQUIRED.
 3. PRECAST DRAINAGE STRUCTURES SHALL COMPLY WITH THE FOLLOWING:
A. CONCRETE STRENGTH: 4,000 PSI @ 28 DAYS
B. REINFORCING STEEL: ASTM A496-A615, GRADE 60 (Fy = 60,000 PSI)
C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
E. INSTALLATION OF PRECAST CONCRETE DRAINAGE STRUCTURES SHALL COMPLY WITH ASTM C 891.
 4. FLAT SLAB TOPS (NO JOINT) MUST HAVE TOP AND BOTTOM STEEL.
 5. MANHOLE STEPS TO BE S.S. OR STEEL REINFORCED COPOLYMER POLYPROPYLENE.
 6. THE DEPTH OF THE CAST-IN-PLACE BENCH SHALL BE EQUAL TO $\frac{1}{3}$ OF THE DIAMETER OF THE SEWER.
 7. THE BENCH SHALL SLOPE TOWARD THE INVERT CHANNEL AT A RATE OF 1" PER FOOT.
 8. PIPE CONNECTIONS SHALL BE GROUTED FIRMLY AND NEATLY IN PLACE WITH NON-SHRINK GROUT.
 9. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO INVERT EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

1 4-FT MANHOLE
NTS

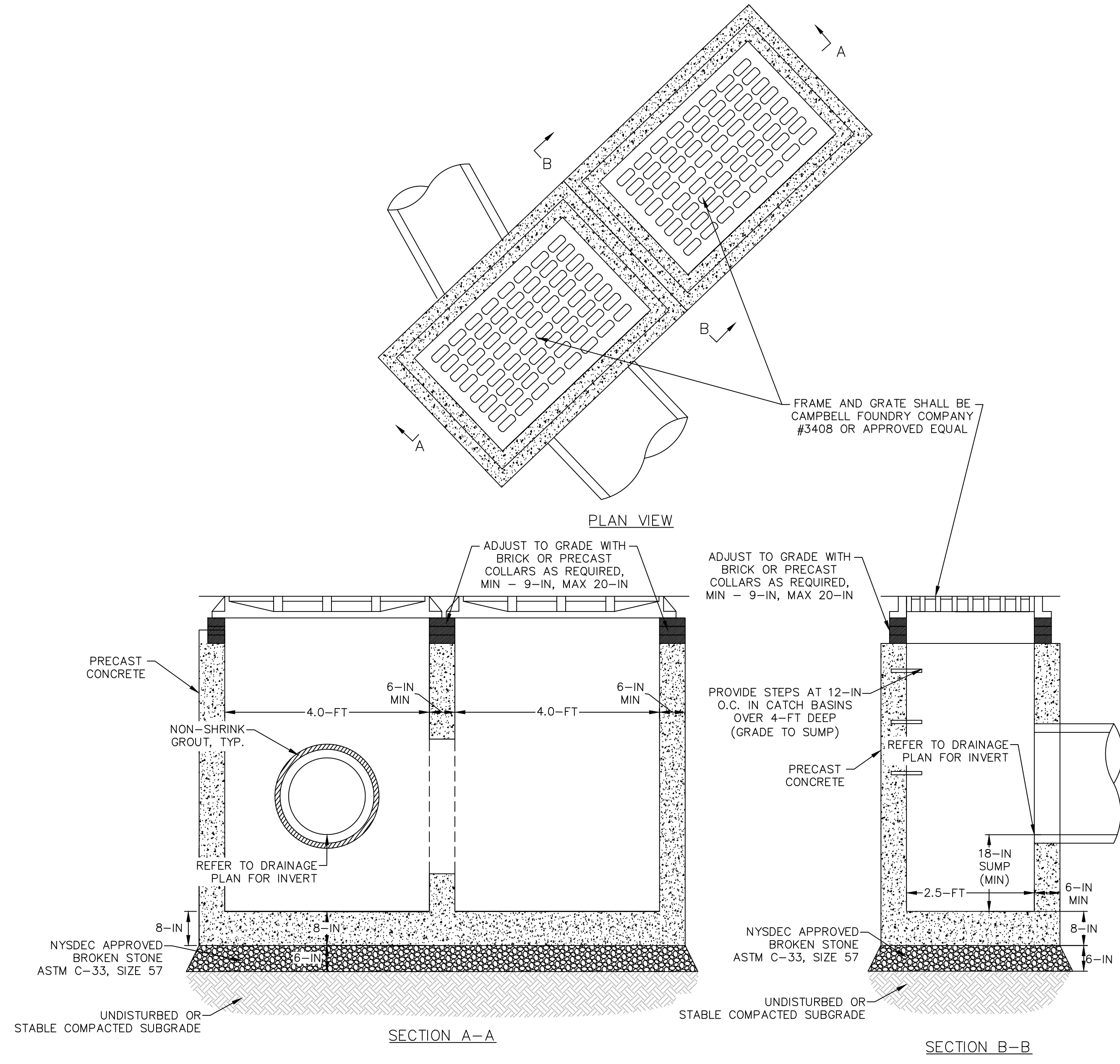
2 5-FT MANHOLE
NTS



- NOTES:
1. SOIL CONDITIONS AT BOTTOM OF EXCAVATION DEEMED UNSUITABLE BY FIELD ENGINEER SHALL BE EXCAVATED TO SUITABLE MATERIAL OR A MAXIMUM OF TWO ADDITIONAL FEET OF BEDDING MATERIAL.
 2. PRECAST DRAINAGE STRUCTURES SHALL COMPLY WITH THE FOLLOWING:
A. CONCRETE STRENGTH: 4,000 PSI @ 28 DAYS
B. REINFORCING STEEL: ASTM A496-A615, GRADE 60 (Fy = 60,000 PSI)
C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
E. INSTALLATION OF PRECAST CONCRETE DRAINAGE STRUCTURES SHALL COMPLY WITH ASTM C 891.
 3. INTERIOR STRUCTURE DIMENSIONS SHOW ARE MINIMUM VALUES. PROVIDE DIMENSIONS AS NEEDED TO ACCOMMODATE 6-INCH CLEARANCE FROM SIDE WALLS OF BASIN TO OUTSIDE OF PIPE PENETRATION.
 4. ALL PIPE PENETRATIONS SHALL BE FLUSH WITH THE INSIDE WALLS OF THE CATCH BASIN. PIPE CONNECTIONS SHALL BE GROUTED FIRMLY AND NEATLY IN PLACE WITH NON-SHRINK GROUT.
 5. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO SUMP EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

3 TRENCH DRAIN
NTS

4 SINGLE CATCH BASIN
NTS

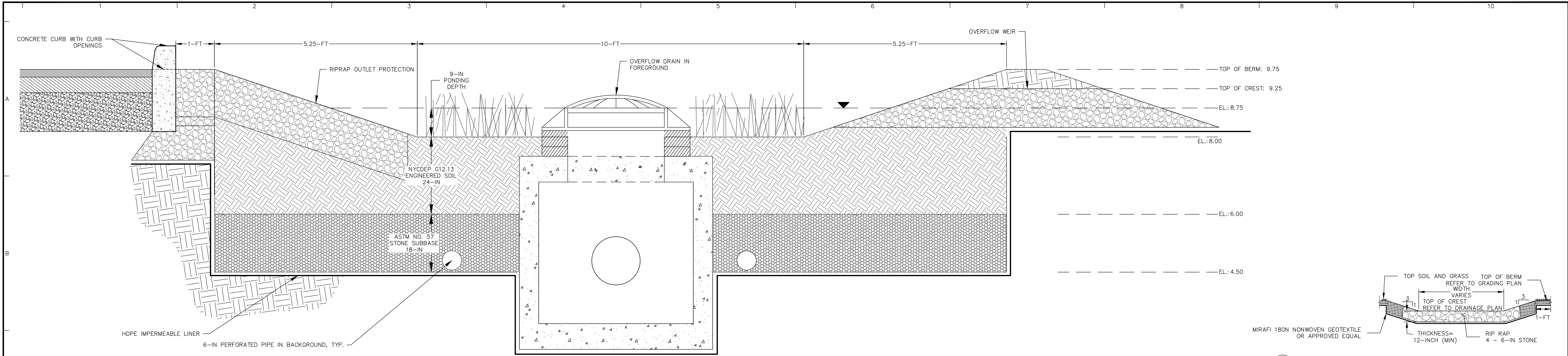


- NOTES:
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C. ENTRAINED AIR: 5.0 - 9.0 PERCENT
D. DESIGN LOAD: AASHTO H-20-44 WITH 30% IMPACT AND 130 PSF EQUIVALENT SOIL PRESSURE
E. INSTALLATION OF PRECAST CONCRETE DRAINAGE STRUCTURES SHALL COMPLY WITH ASTM C 891.
 3. INTERIOR STRUCTURE DIMENSIONS SHOW ARE MINIMUM VALUES. PROVIDE DIMENSIONS AS NEEDED TO ACCOMMODATE 6-INCH CLEARANCE FROM SIDE WALLS OF BASIN TO OUTSIDE OF PIPE PENETRATION.
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 5. STEPS TO BE STAINLESS STEEL OR STEEL REINFORCED CO-POLYMER PROPYLENE. STEPS SHALL BE PROVIDED WHEN THE DEPTH FROM GRADE TO SUMP EXCEEDS 4-FT. THE TOP STEP SHALL BE WITHIN 36-IN OF GRADE.

5 DOUBLE CATCH BASIN
NTS

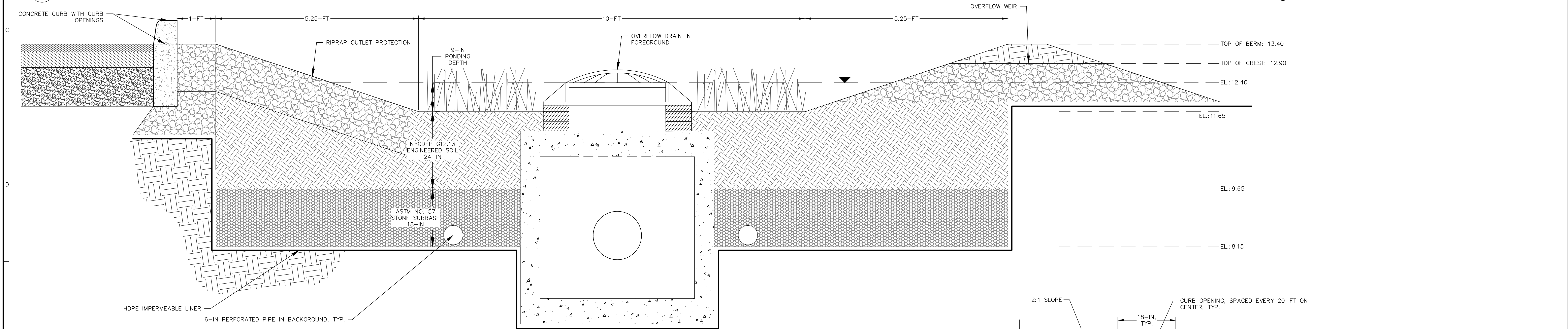
WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
SIGNATURE: PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		
DATE SIGNED: 12/20/2024		
LANGAN Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com		
Project: 2731 WEST 12TH STREET SWPPP BLOCK No. 7247, LOT No. 106 BROOKLYN KINGS COUNTY NEW YORK		
Drawing Title: POST DEVELOPMENT DRAINAGE DETAILS		
Project No. 170697301	Drawing No. C-401	
Date: 12/20/2024	Drawn By: MG	
Checked By: BC	Sheet 11 of 13	

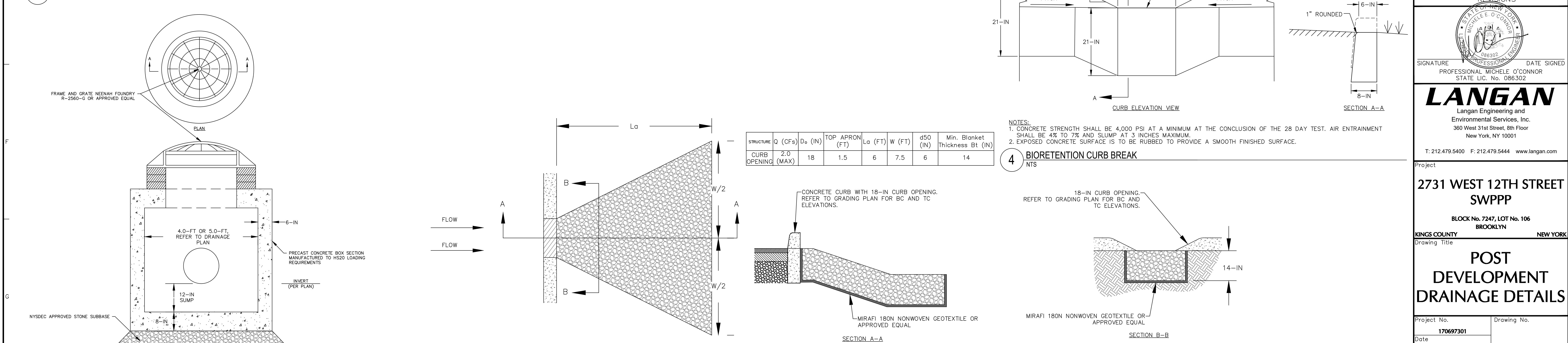


1 BIORETENTION SECTION A-A
NTS

3 OVERFLOW WEIR
NTS



2 BIORETENTION SECTION B-B
NTS




5 BIORETENTION OVERFLOW DRAIN
NTS

6 BIORETENTION RIPRAP OUTLET PROTECTION
NTS

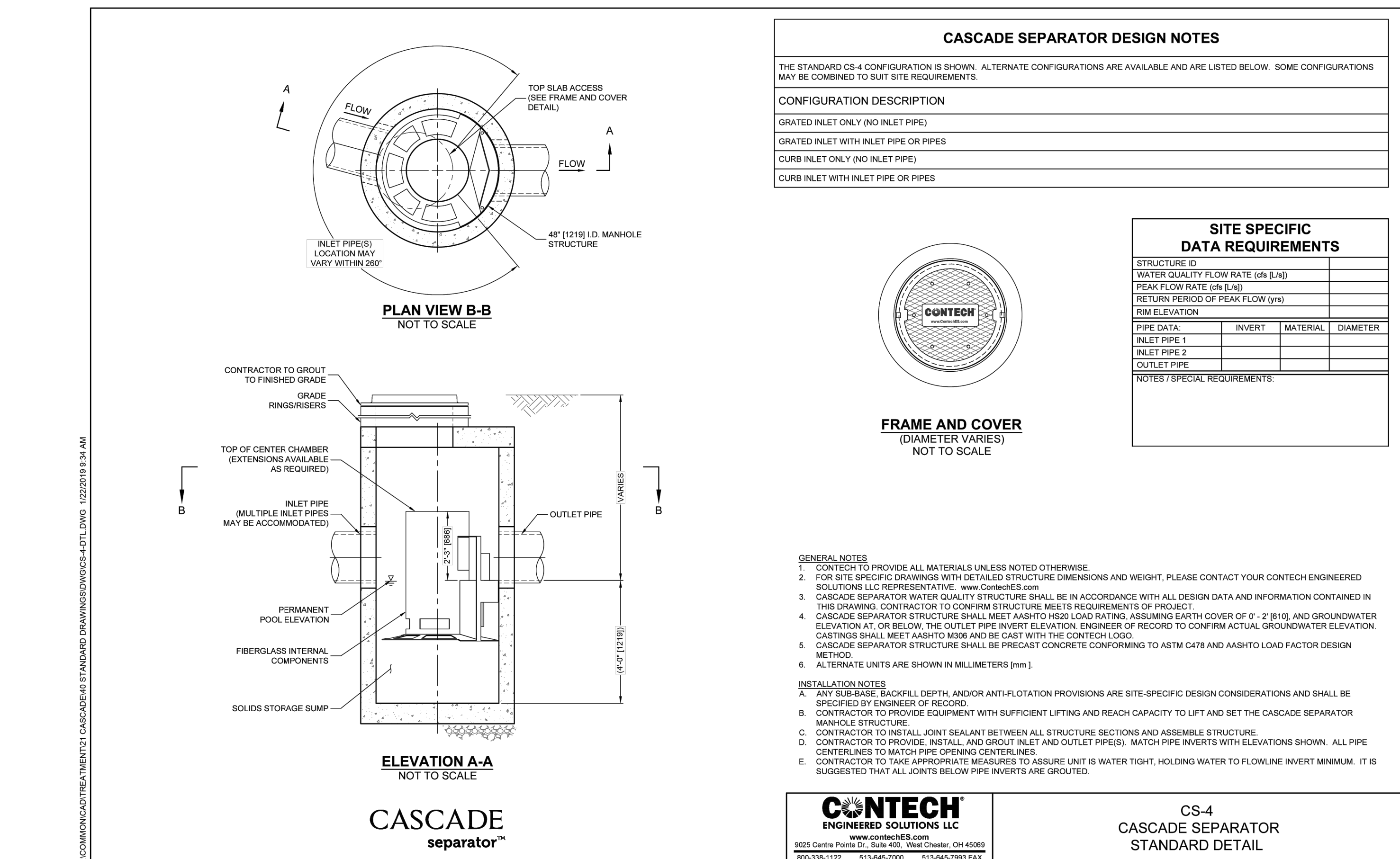
4 BIORETENTION CURB BREAK
NTS

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REVISIONS		
		
SIGNATURE PROFESSIONAL MICHELE O'CONNOR STATE LIC. No. 086302		DATE SIGNED
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Project		
2731 WEST 12TH STREET SWPPP		
BLOCK No. 7247, LOT No. 106 BROOKLYN		
KINGS COUNTY		NEW YORK
Drawing Title		
POST DEVELOPMENT DRAINAGE DETAILS		
Project No. 170697301		Drawing No. C-402
Date 12/20/2024		
Drawn By MG		
Checked By		
BC		
Sheet 12 of 13		

- NOTES:
- CONTRACTOR TO PROVIDE SUBMITTAL FOR HDPE IMPERMEABLE LINER TO BE USED BENEATH RIPRAP OUTLET PROTECTION. SUBMITTAL IS SUBJECT TO REVIEW AND APPROVAL BY NATIONAL GRID AND NYSDEC.
 - SEE RIPRAP STANDARDS AND SPECIFICATIONS MINIMUM TAILWATER CONDITIONS
 - SEE FIGURE 3.44 OF NYS EROSION AND SEDIMENT CONTROL MANUAL

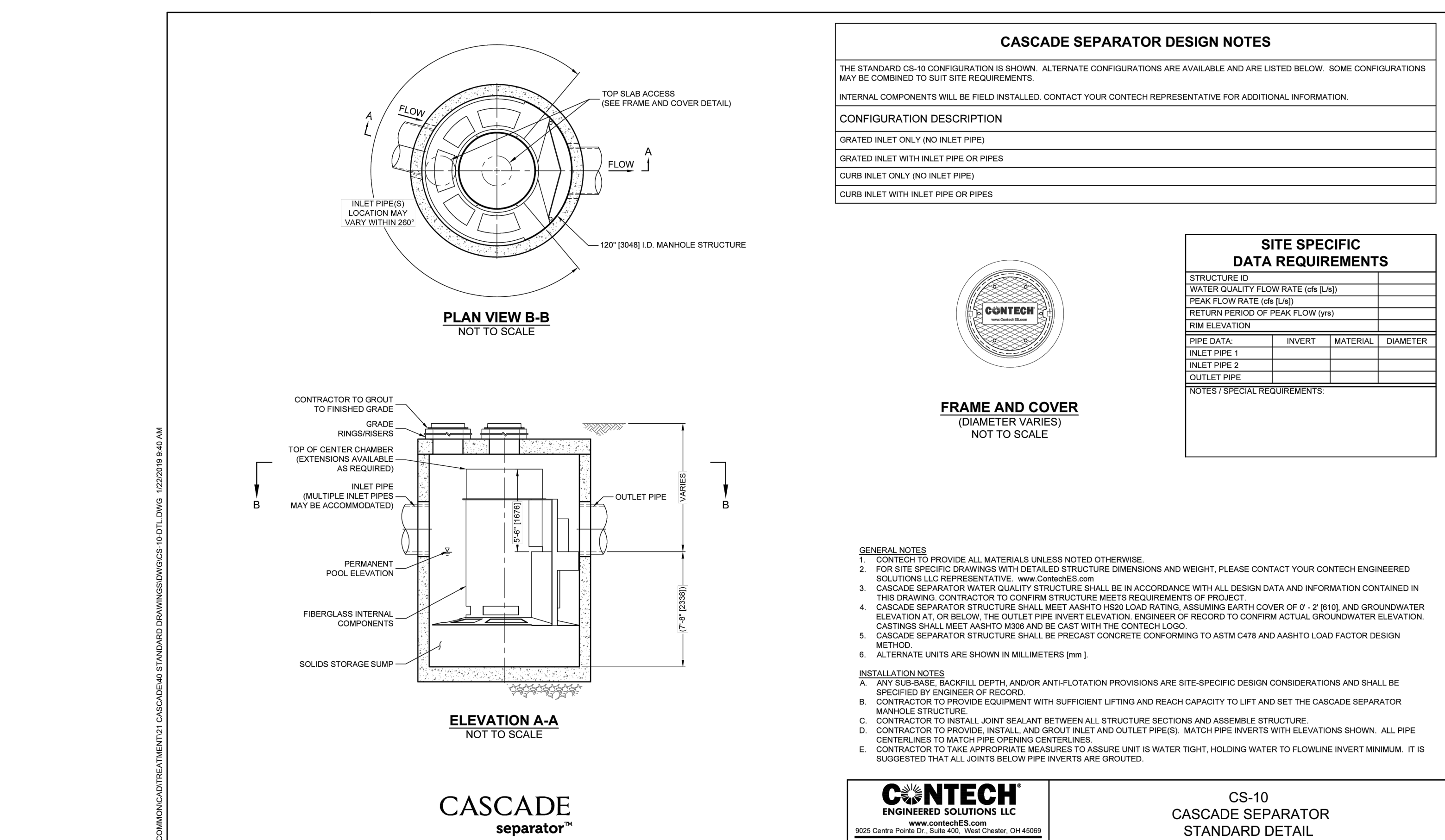
1 RIPRAP OUTLET PROTECTION
NTS



4 WATER QUALITY UNIT - CONTECH CS-4
NTS

- NOTES:
- CONCRETE CLASS "C" WITH DESIGN STRENGTH OF 5000 PSI AT 28 DAYS.
 - STEEL REINFORCEMENT: ASTM A-615 GRADE 60 OR ASTM A-497 WELDED WIRE FABRIC.
 - DESIGN FOR 1520 L/SEC.
 - ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".

2 CONCRETE HEADWALL
NTS



5 WATER QUALITY UNIT - CONTECH CS-10
NTS

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OUTFALL	Q (CFS)	D _o (IN)	TOP APRON (FT)	L _a (FT)	W (FT)	d50 (IN)	Min. Blanket Thickness B _t (IN)
1	36.8	30	9.25	16	18.5	6	14
2	29.1	30	9.25	16	18.5	6	14
3	41.1	30	9.25	19	21.5	9	20

Date	Description	No.
REVISIONS		
		
SIGNATURE	PROFESSIONAL MICHELE O'CONNOR	DATE SIGNED
STATE LIC. No. 086302		
LANGAN		
Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001		
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Project		
2731 WEST 12TH STREET SWPPP		
BLOCK No. 7247, LOT No. 106 BROOKLYN NEW YORK		
KINGS COUNTY		
Drawing Title		
POST DEVELOPMENT DRAINAGE DETAILS		
Project No.	Drawing No.	
170697301	C-403	
Date	12/20/2024	
Drawn By	MG	
Checked By	BC	
Sheet 13 of 13		

APPENDIX A

Water Quality Calculations

2731 West 12th Street - Prologis

Stormwater Water Quality and Runoff Reduction Calculations

Site Information:

General:

Lot Area	730989 SF (16.8 ac)
Sewer Type	N/A - Discharges to Coney Island Creek
New Impervious Area	465115 sf (10.1 ac)

Site Characteristics:

Cover Type	Cover Area (sf)	Runoff Coeff. (C)
Roof Area	0	0.95
Pavement Area	465115	0.85
Green Roof Area	0	0.70
Landscaped Area	265874	0.20
Total	730989	0.61

Required Stormwater Quality Volume (WQ_V):

$$WQ_V = \left(\frac{1.5''}{12} \right) \times A \times R_V$$

$$R_V = 0.05 + (0.009 \times I)$$

A_S = Site Area (SF)

R_V = Runoff Coefficient Relating Total Rainfall to Runoff

WQ_V = Water Quality Volume (CF)

I = Percent Impervious Cover

Impervious Cover = 64%

$$R_V = (0.05) + (0.009 \times 64\%)$$

$$WQ_V = (1.5/12) \times 0.95 \times 730989 \text{ (SF)}$$

A_S	I%	R_V	WQ_V(CF)
730989	61	0.60	55027

Runoff Reduction Volume (RR_v):

$$RR_v = \left(\frac{1.5''}{12} \right) \times 0.95 \times A_{ic} \times S$$

RR_v = Runoff Reduction Volume (CF)A_{ic} = Total Area of New Impervious Cover (SF)

S = Specific Reduction Factor (from HSG)

A _{ic}	S	RR _v
465115	0.20	11046

Provided Volume (V_{PROV}):

SMP Type	Drainage Area	V _{PROV} (CF)	WQ _v (CF)	RR _v (CF)
Bioretention Basin #1	137057	20174	20174	8070
Bioretention Basin #2	60454	16504	16504	6602
Hydrodynamic Separator CS-10	250906	29795	29795	0
Hydrodynamic Separator CS-4	46153	5481	5481	0
Total	494570	71954	71954	14671

*Filtration contributes 40% volume to RR_v

*Refer to calculation sheet within this appendix for volume provided by SMPs.

WQ_v: 71954 CF > 55027 CFRR_v: 14671 CF > 11046 CF**Water treatment volume to be managed by SMPs**

Coney Island Creek - 2731 West 12th Street

Bioretention

Volume of SMP	$V_{SMP} = V_P + V_S + V_D - V_{DRAIN}$
Ponding Volume	$V_P = A_{SMP} * D_p$
Soil Volume	$V_s = A_{SMP} * D_s * n_s$
Internal Drain Volume (Modular)	$V_{DRAIN} = V_S * N_S$
Drainage Layer Volume	$V_D = A_{SMP} * D_D * n_D$

INPUTS:

Basin 1

Units

Enter Tributary Drainage Area

TDA 137,057 *sf*

WQv Required for TDA

16,276 *cf*

Enter bioretention area

A_{SMP} 11,828 *sf*

Enter depth of ponding above surface

D_P 0.75 *ft*

Enter depth of the soil media layer

D_S 2.000 *ft*

Enter porosity of soil media

n_S 0.200

Enter the volume of internal drain (1)

V_S 75 *cf*

Enter the number of internal drains

V_N 7

Enter depth of the drainage layer

D_D 1.500 *ft*

n_D 0.4 *ft*

Enter porosity of the drainage layer

Volume provided in ponding layer

V_P 8871 *cf*

Volume provided in soil media

V_S 4731 *cf*

Volume of internal drains

V_{DRAIN} 525 *cf*

Volume provided in drainage layer

V_D 7097 *cf*

Total storage volume of treatment in stormwater planter

V_{stor} 20174 *cf*
0.46 *ac-ft*

Basin 2

		Units
Enter Tributary Drainage Area	TDA	60,454 <i>sf</i>
WQv Required for TDA		7,179 <i>cf</i>
Enter bioretention area	A _{SMP}	9,604 <i>sf</i>
Enter depth of ponding above surface	D _P	0.75 <i>ft</i>
Enter depth of the soil media layer	D _S	2.000 <i>ft</i>
Enter porosity of soil media	n _S	0.200
Enter the volume of internal drain (1)	VS	75 <i>cf</i>
Enter the number of internal drains	VN	4
Enter depth of the drainage layer	D _D	1.500 <i>ft</i>
Enter porosity of the drainage layer	n _D	0.4 <i>ft</i>
Volume provided in ponding layer	V _P	7203 <i>cf</i>
Volume provided in soil media	V _S	3842 <i>cf</i>
Volume of internal drains	V _{DRAIN}	300 <i>cf</i>
Volume provided in drainage layer	V _D	5763 <i>cf</i>
Total storage volume of treatment in stormwater planter	V _{stor}	16507 <i>cf</i>
		0.38 <i>ac-ft</i>

DRAINAGE AREA TRIBUTARY TO HDS UNIT CS-4

Water Quality Volume Calculation, WQv:

$$WQv = 1.5/12 \times Rv \times A$$

Where: P = 90% Rainfall Event Number (See Figure 4.1) = 1.5
 I = Impervious Cover (Percent)
 $Rv = 0.05 + 0.009 (I)$; Min Rv = 0.2
 A = Site Area in acres

I = 100 %
 Rv = 0.950
 A = 1.060 ac 46,153 sf

***The project is required to treat 100% of the WQv.**

WQv = 0.126 acre-feet or 5,481 cubic feet

Water Quality Peak Flow Calculation, Qp:

$$CN = \frac{1000}{[10 + 5P + 10Q - 10(Q^2 + 1.25 QP)^{1/2}]}$$

Where: P = 90% Rainfall Event Number (See Figure 4.1) = 1.5
 Q = runoff volume, in inches = 1.43

CN = 99.36
 Use CN = 98
 Tc = 0.1 hr.

Ia = 0.062 in. (Initial Abstraction - see Table 4-1 from the TR-55 Manual)
 Ia/P = 0.041
 qu = 650 cms/in (Unit Peak Discharge - see Exhibit 4-III from the TR-55 Manual)

Qp = qu * A * WQv

Where: WQv = Water Quality Volume in inches - also referred to as Q
 A = drainage area in square miles

Qp = 1.53 cfs

Treatment Unit CS-4: approved for treatment of 1.80-cfs

WATER QUALITY VOLUME AND PEAK FLOW RATE CALCULATIONS

DRAINAGE AREA TRIBUTARY TO HDS UNIT CS-10

Water Quality Volume Calculation, WQv:

$$WQv = 1.5/12 \times Rv \times A$$

Where: P = 90% Rainfall Event Number (See Figure 4.1) = 1.5
 I = Impervious Cover (Percent)
 $Rv = 0.05 + 0.009 (I)$; Min Rv = 0.2
 A = Site Area in acres

I = 100 %
 Rv = 0.950
 A = 5.760 ac 250,906 sf

***The project is required to treat 100% of the WQv.**

WQv = 0.684 acre-feet or 29,795 cubic feet

Water Quality Peak Flow Calculation, Qp:

$$CN = \frac{1000}{[10 + 5P + 10Q - 10(Q^2 + 1.25 QP)^{1/2}]}$$

Where: P = 90% Rainfall Event Number (See Figure 4.1) = 1.5
 Q = runoff volume, in inches = 1.43

CN = 99.36
 Use CN = 98
 Tc = 0.1 hr.

Ia = 0.041 in. (Initial Abstraction - see Table 4-1 from the TR-55 Manual)
 Ia/P = 0.027
 qu = 650 cms/in (Unit Peak Discharge - see Exhibit 4-III from the TR-55 Manual)

Qp = qu * A * WQv

Where: WQv = Water Quality Volume in inches - also referred to as Q
 A = drainage area in square miles

Qp = 8.34 cfs

Treatment Unit CS-10: approved for treatment of 11.3-cfs

APPENDIX B

Operations and Maintenance (O&M) Manual for SMPs

BIORETENTION OPERATION AND MAINTENANCE (O&M) MANUAL

Entity responsible for maintenance:

Prologis

Sheila Sutton

ssutton@prologis.com

SMPs to be maintained:

- BIORETENTION

Post Construction Inspection and Maintenance Site Checklist

BIORETENTION	Yes	No	NA
Watering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ol style="list-style-type: none"> 1. <u>Maintenance</u>: Watering of new plantings during the first two years of establishment 2. <u>Frequency</u>: During extended dry periods of no significant precipitation within 7 days, or as needed based on plant condition 			
Weeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ol style="list-style-type: none"> 1. <u>Maintenance</u>: Removal of non-native or undesirable vegetation 2. <u>Frequency</u>: Quarterly at minimum during the growing season or more frequently based on ongoing inspections 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mulching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ol style="list-style-type: none"> 1. <u>Maintenance</u>: Mulching of planting beds. 2. <u>Frequency</u>: Once annually for the first two growing seasons or until beds have filled in 			
Vegetation Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ol style="list-style-type: none"> 1. <u>Maintenance</u>: Cutting and trimming of detrital herbaceous vegetation from the previous growing season to four to six inches above the ground 2. <u>Frequency</u>: Annually in late winter or early spring prior to break in dormancy 			
Sediment Removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ol style="list-style-type: none"> 1. <u>Maintenance</u>: Removal of accumulated sediment and debris from practice areas 2. <u>Frequency</u>: Twice per year or more frequently if needed based on ongoing inspections (note: leaves and other natural materials can be left in place if they do not impede conveyance) 			
Pipe Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. <u>Maintenance:</u> Hydraulic cleaning of inflow, outflow and underdrain piping			
2. <u>Frequency:</u> As warranted based on video pipe inspections conducted every three years			
Inlet Filter Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. <u>Maintenance:</u> Emptying of inlet filter bags and/or baskets			
2. <u>Frequency:</u> Minimum quarterly or more frequently based on ongoing inspections			
Inlet Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. <u>Maintenance:</u> Vacuum cleaning of accumulated sediment and debris within inlets sumps and hoods			
2. <u>Frequency:</u> Minimum annually or more frequently if debris accumulation is rapid based on ongoing and annual inspections			
Outlet Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. <u>Maintenance:</u> Removal of accumulated sediment and debris from risers (vacuum cleaning), trash racks, and spillways and clearing sediment from orifices and outlet control structures to prevent clogging			
2. <u>Frequency:</u> Annually at minimum or more frequently based on ongoing and annual inspections			
Erosion Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. <u>Maintenance:</u> Stabilization of eroded soil areas with vegetative or mechanical means			
2. <u>Frequency:</u> As warranted based on ongoing inspections			

Notes:

1. The site must be returned to the approved conditions when any repairs are made.

Date of inspection: _____

Comments:

Actions to be taken:

Cascade Separator[®] Inspection and Maintenance Guide



Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

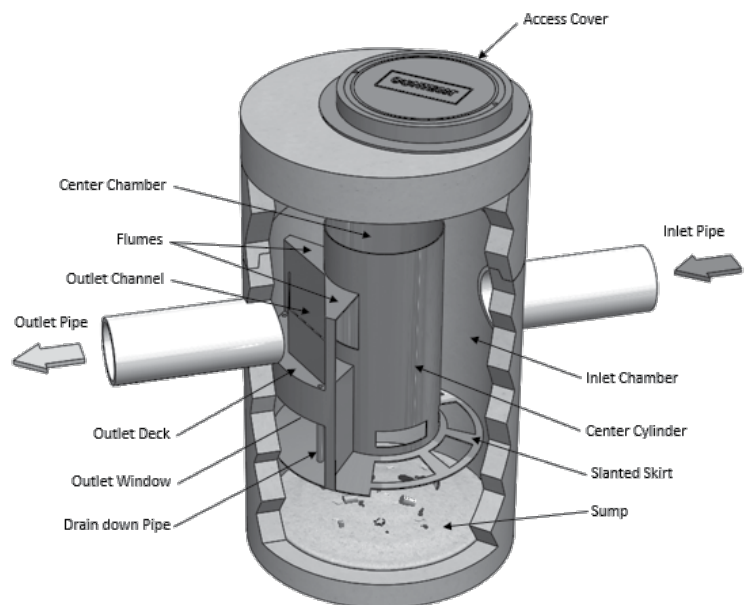
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

[illegible]

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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APPENDIX C

Contech Specifications – Hydrodynamic Separator

SECTION (____)
STORM WATER TREATMENT DEVICE

1.0 GENERAL

- 1.1 This item shall govern the furnishing and installation of the Cascade Separator® by Contech Engineered Solutions LLC, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.
- 1.2 The Contractor shall furnish all labor, equipment and materials necessary to install the storm water treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.
- 1.3 The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the SWTD(s) shall be a Cascade Separator™ device manufactured by:

Contech Engineered Solutions LLC
9100 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122

1.4 Related Sections

- 1.4.1 Section 02240: Dewatering
 - 1.4.2 Section 02260: Excavation Support and Protection
 - 1.4.3 Section 02315: Excavation and Fill
 - 1.4.4 Section 02340: Soil Stabilization
- 1.5 All components shall be subject to inspection by the engineer at the place of manufacture and/or installation. All components are subject to being rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.
 - 1.6 The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period. The use of SWTD components shall be limited to the application for which it was specifically designed.
 - 1.7 The SWTD manufacturer shall submit to the Engineer of Record a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research

- 1.8 No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the Engineer of Record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

2.0 MATERIALS

- 2.1 Housing unit of stormwater treatment device shall be constructed of pre-cast or cast-in-place concrete, no exceptions. Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:
- 2.1.1 Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
 - 2.1.2 Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
 - 2.1.3 Cement shall be Type III Portland Cement conforming to ASTM C 150;
 - 2.1.4 Aggregates shall conform to ASTM C 33;
 - 2.1.5 Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185, or A 497.
 - 2.1.6 Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
 - 2.1.7 Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.
- 2.2 Internal Components and appurtenances shall conform to the following:
- 2.2.1 Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
 - 2.2.2 Support brackets shall be manufactured of 5052 aluminum
 - 2.2.3 Fiberglass components shall conform to applicable sections of ASTM D-4097
 - 2.2.4 Polypropylene copolymer components shall conform to a tensile strength of 3,600 psi (ASTM D-638), and Izod impact value of "no break" (ASTM D-256).
 - 2.2.5 Access system(s) conform to the following:
Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

3.0 PERFORMANCE

- 3.1 The SWTD shall be sized to either achieve an 80 percent average annual reduction in the total suspended solid load or treat a flow rate designated by the jurisdiction in which the project is located. Both methods should be sized using the OK-110 particle distribution having particles ranging from 53 microns to 212 microns with a d50 of around 110 microns.
- 3.2 The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage

capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 16 inches in diameter.

- 3.3 The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills and have a capacity listed in Table 1 of the required unit.
- 3.4 The SWTD shall convey the flow from the peak storm event of the drainage network, in accordance with required hydraulic upstream conditions as defined by the Engineer. If a substitute SWTD is proposed, supporting documentation shall be submitted that demonstrates equal or better upstream hydraulic conditions compared to that specified herein. This documentation shall be signed and sealed by a Professional Engineer registered in the State of the work. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

4.0 EXECUTION

- 4.1 The contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be borne by the contractor.
- 4.2 The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.
- 4.3 The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.
- 4.4 The contractor shall removal all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

TABLE 1: Storm Water Treatment Device Storage Capacities

Cascade Model	Minimum Sump Storage Capacity (yd ³)	Minimum Oil Storage Capacity (gal)
CS-3	0.41	59.0
CS-4	0.70	141.0
CS-5	1.09	269.3
CS-6	1.57	475.9
CS-8	2.79	1128.0
CS-10	4.36	2203.2
CS-12	6.28	3807.1

END OF SECTION

APPENDIX D

USDA Soil Report



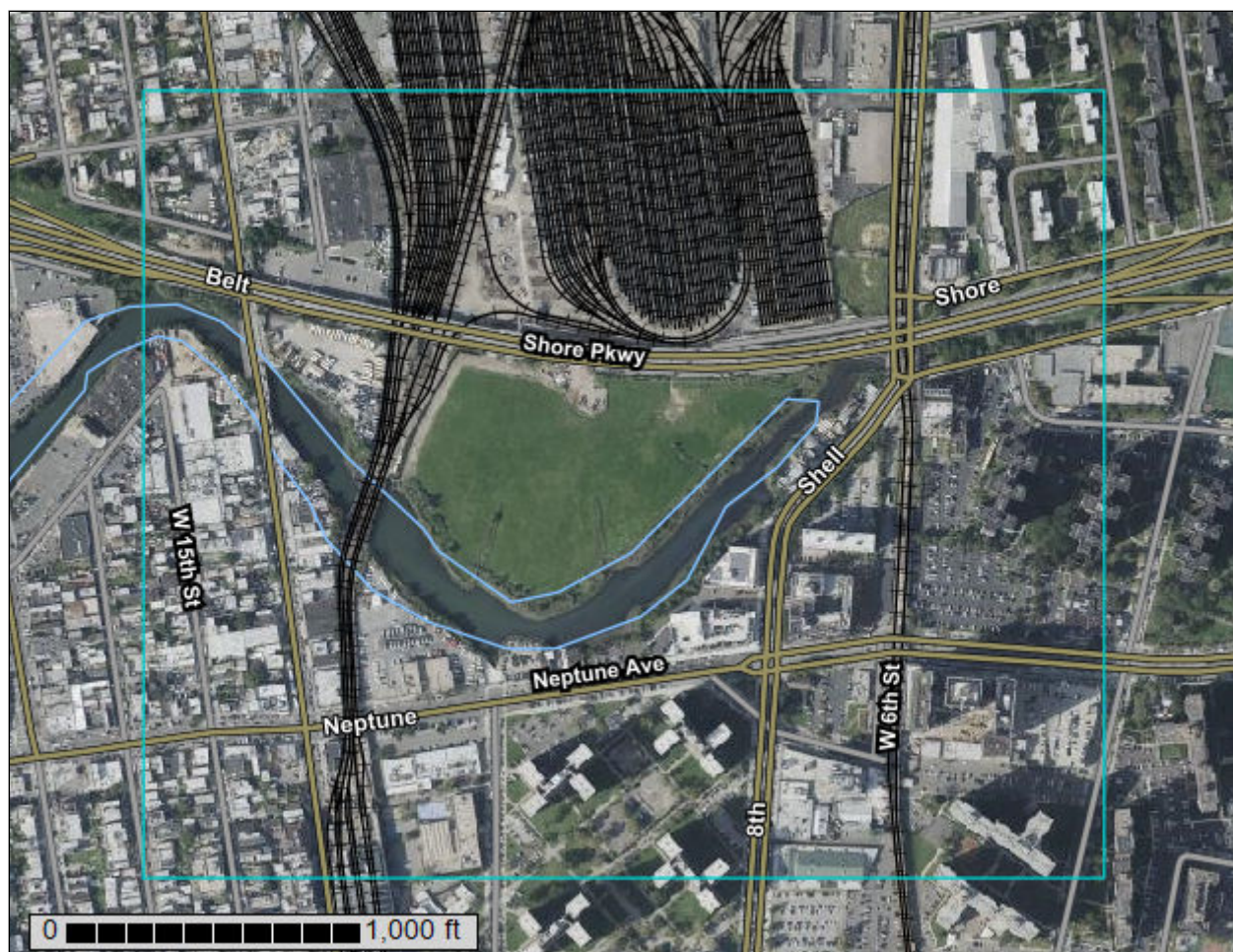
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Kings County, New York**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

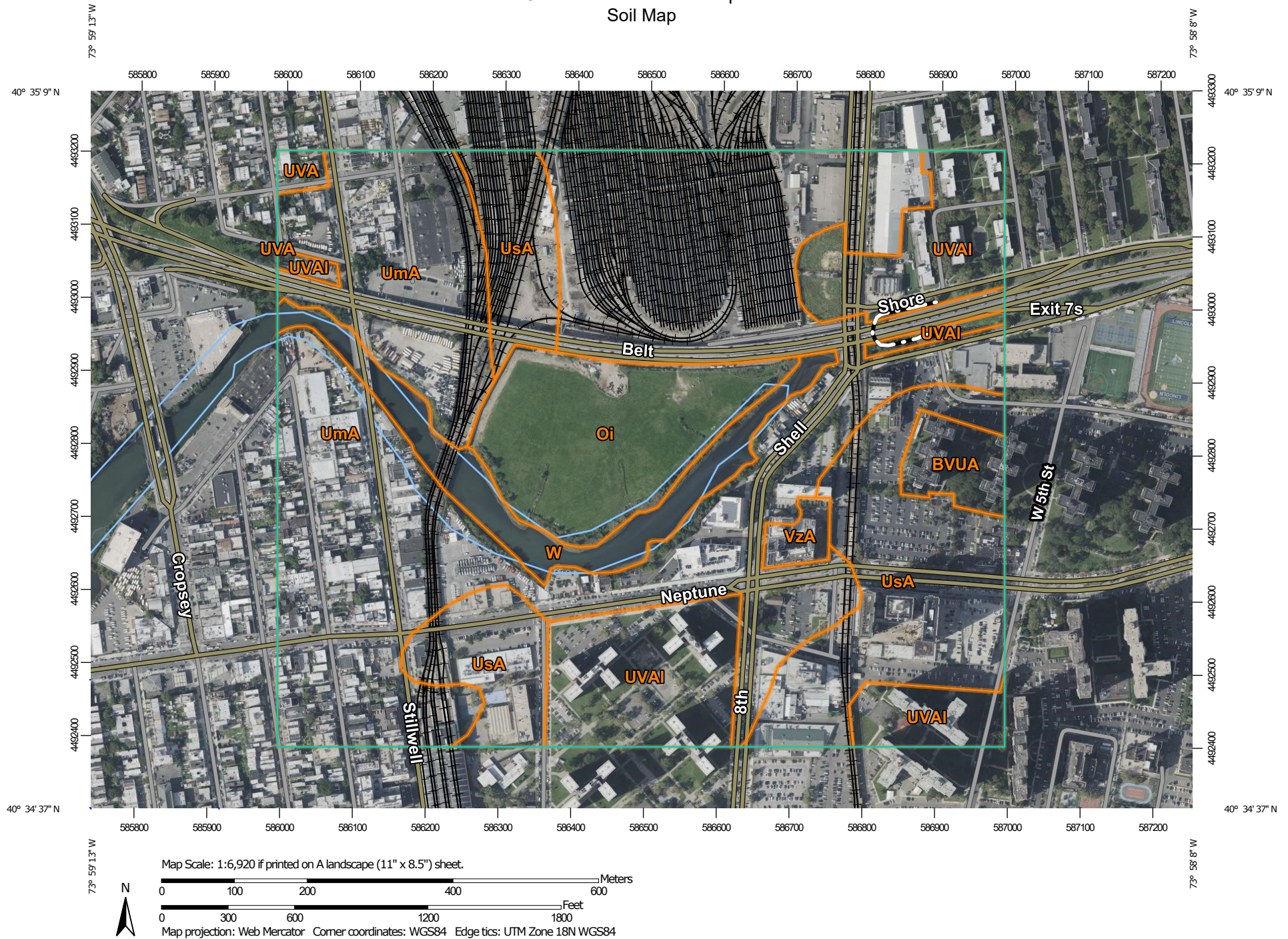
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Custom Soil Resource Report Soil Map



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kings County, New York

Survey Area Data: Version 14, Sep 4, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BVUA	Bigapple-Verrazano-Urban land complex, 0 to 3 percent slopes	3.7	1.8%
Oi	Oil-waste land	18.1	9.0%
UmA	Urban land, tidal marsh substratum, 0 to 3 percent slopes	102.6	50.7%
UsA	Urban land, sandy substratum, 0 to 3 percent slopes	37.0	18.3%
UVA	Urban land-Verrazano complex, 0 to 3 percent slopes	0.9	0.4%
UVAI	Urban land-Verrazano complex, 0 to 3 percent slopes, low impervious surface	28.1	13.9%
VzA	Verrazano sandy loam, 0 to 3 percent slopes	1.6	0.8%
W	Water	10.4	5.1%
Totals for Area of Interest		202.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas

are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Kings County, New York

BVUA—Bigapple-Verrazano-Urban land complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2pddn
Elevation: 0 to 10 feet
Mean annual precipitation: 40 to 52 inches
Mean annual air temperature: 47 to 62 degrees F
Frost-free period: 216 to 234 days
Farmland classification: Not prime farmland

Map Unit Composition

Bigapple, sandy loam, and similar soils: 45 percent
Verrazano and similar soils: 35 percent
Urban land, sandy substratum: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bigapple, Sandy Loam

Setting

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy human-transported material over sandy dredge spoils

Typical profile

^A - 0 to 7 inches: sandy loam
2^C - 7 to 72 inches: stratified gravelly coarse sand to sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 20.00 in/hr)
Depth to water table: About 59 to 79 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 6 percent
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F149BY100NY - Urban Site Complex
Hydric soil rating: No

Description of Verrazano

Setting

Landform position (two-dimensional): Backslope, summit, footslope, toeslope
Landform position (three-dimensional): Crest, side slope, base slope, talf, rise

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Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Loamy human-transported material over beach sand and/or sandy outwash and/or dredge spoils

Typical profile

^A - 0 to 3 inches: sandy loam

^Bw - 3 to 17 inches: sandy loam

^BC - 17 to 24 inches: loam

2C - 24 to 72 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 8 percent

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F149BY100NY - Urban Site Complex

Hydric soil rating: No

Description of Urban Land, Sandy Substratum

Setting

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Asphalt over human-transported material

Typical profile

M1 - 0 to 6 inches: cemented material

M2 - 6 to 20 inches: cemented material

2^C - 20 to 72 inches: coarse sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 0 inches to manufactured layer

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Oi—Oil-waste land

Map Unit Setting

National map unit symbol: 2qx46

Elevation: 0 to 60 feet

Mean annual precipitation: 40 to 52 inches

Mean annual air temperature: 47 to 62 degrees F

Frost-free period: 216 to 234 days

Farmland classification: Not prime farmland

Map Unit Composition

Oil-waste land: 86 percent

Minor components: 14 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oil-waste Land

Setting

Landform position (three-dimensional): Talf, dip, rise

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Barren human-transported material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Minor Components

Urban land, tidal marsh substratum

Percent of map unit: 10 percent

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: Unranked

Bigapple

Percent of map unit: 2 percent

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Rise, talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Verrazano

Percent of map unit: 2 percent

Landform position (two-dimensional): Backslope, summit, footslope, toeslope

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Landform position (three-dimensional): Crest, side slope, base slope, talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

UmA—Urban land, tidal marsh substratum, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2pbc9
Elevation: 0 to 100 feet
Mean annual precipitation: 40 to 52 inches
Mean annual air temperature: 47 to 62 degrees F
Frost-free period: 216 to 234 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, tidal marsh substratum: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Tidal Marsh Substratum

Setting

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Asphalt over human-transported material

Typical profile

M1 - 0 to 6 inches: cemented material
M2 - 6 to 20 inches: cemented material
2^C - 20 to 79 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 20 inches
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Laguardia

Percent of map unit: 5 percent

Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope

Landform position (three-dimensional): Base slope, side slope, crest, rise, dip, talf

Down-slope shape: Concave, convex, linear

Across-slope shape: Concave, linear, convex

Hydric soil rating: No

Greenbelt

Percent of map unit: 1 percent

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Crest, side slope, base slope, talf

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Centralpark

Percent of map unit: 1 percent

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Ebbets

Percent of map unit: 1 percent

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Side slope, crest, base slope, talf

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

UsA—Urban land, sandy substratum, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2pbjl

Elevation: 0 to 80 feet

Mean annual precipitation: 40 to 52 inches

Mean annual air temperature: 47 to 62 degrees F

Frost-free period: 216 to 234 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land, sandy substratum: 92 percent

Minor components: 8 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Sandy Substratum

Setting

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Asphalt over human-transported material

Typical profile

M1 - 0 to 6 inches: cemented material
M2 - 6 to 20 inches: cemented material
2^C - 20 to 72 inches: coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Breeze

Percent of map unit: 5 percent
Landform position (two-dimensional): Shoulder, footslope, backslope, summit
Landform position (three-dimensional): Base slope, side slope, crest, rise, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Bigapple

Percent of map unit: 1 percent
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hooksan

Percent of map unit: 1 percent
Landform: Dunes
Landform position (two-dimensional): Toeslope, footslope, backslope, summit
Landform position (three-dimensional): Crest, base slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Verrazano

Percent of map unit: 1 percent

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Landform position (two-dimensional): Toeslope, footslope, summit, backslope

Landform position (three-dimensional): Base slope, side slope, crest, rise, talf

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

UVA—Urban land-Verrazano complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2pbjj

Elevation: 0 to 110 feet

Mean annual precipitation: 40 to 52 inches

Mean annual air temperature: 47 to 62 degrees F

Frost-free period: 216 to 234 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land, sandy substratum: 78 percent

Verrazano and similar soils: 12 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Sandy Substratum

Setting

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Asphalt over human-transported material

Typical profile

M1 - 0 to 6 inches: cemented material

M2 - 6 to 20 inches: cemented material

2^C - 20 to 72 inches: coarse sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 0 inches to manufactured layer

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Verrazano

Setting

Landform position (two-dimensional): Toeslope, footslope, summit, backslope

Landform position (three-dimensional): Base slope, side slope, crest, rise, talf

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Loamy human-transported material over beach sand and/or sandy outwash and/or dredge spoils

Typical profile

^A - 0 to 3 inches: sandy loam

^Bw - 3 to 17 inches: sandy loam

^BC - 17 to 24 inches: loam

2C - 24 to 72 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 8 percent

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F149BY100NY - Urban Site Complex

Hydric soil rating: No

Minor Components

Hooksan

Percent of map unit: 5 percent

Landform: Dunes

Landform position (two-dimensional): Toeslope, footslope, backslope, summit

Landform position (three-dimensional): Crest, base slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Bigapple

Percent of map unit: 3 percent

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Talf, rise

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Jamaica

Percent of map unit: 2 percent

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Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, tal
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

UVAI—Urban land-Verrazano complex, 0 to 3 percent slopes, low impervious surface

Map Unit Setting

National map unit symbol: 2r306
Elevation: 0 to 70 feet
Mean annual precipitation: 40 to 52 inches
Mean annual air temperature: 47 to 62 degrees F
Frost-free period: 216 to 234 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, sandy substratum: 55 percent
Verrazano and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Sandy Substratum

Setting

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Asphalt over human-transported material

Typical profile

M1 - 0 to 6 inches: cemented material
M2 - 6 to 20 inches: cemented material
2^C - 20 to 72 inches: coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

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Hydric soil rating: Unranked

Description of Verrazano

Setting

Landform position (two-dimensional): Toeslope, footslope, summit, backslope

Landform position (three-dimensional): Base slope, side slope, crest, rise, talf

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Loamy human-transported material over beach sand and/or sandy outwash and/or dredge spoils

Typical profile

^A - 0 to 3 inches: sandy loam

^Bw - 3 to 17 inches: sandy loam

^BC - 17 to 24 inches: loam

2C - 24 to 72 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 8 percent

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F149BY100NY - Urban Site Complex

Hydric soil rating: No

Minor Components

Hooksan

Percent of map unit: 9 percent

Landform: Dunes

Landform position (two-dimensional): Toeslope, footslope, backslope, summit

Landform position (three-dimensional): Crest, base slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Bigapple

Percent of map unit: 8 percent

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Talf, rise

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Jamaica

Percent of map unit: 3 percent
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

VzA—Verrazano sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2pdgj
Elevation: 0 to 90 feet
Mean annual precipitation: 40 to 52 inches
Mean annual air temperature: 47 to 62 degrees F
Frost-free period: 216 to 234 days
Farmland classification: Not prime farmland

Map Unit Composition

Verrazano and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Verrazano

Setting

Landform position (two-dimensional): Toeslope, footslope, summit, backslope
Landform position (three-dimensional): Crest, side slope, base slope, talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy human-transported material over beach sand and/or sandy outwash and/or dredge spoils

Typical profile

^A - 0 to 3 inches: sandy loam
^Bw - 3 to 17 inches: sandy loam
^BC - 17 to 24 inches: loam
2C - 24 to 72 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

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Calcium carbonate, maximum content: 8 percent

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F149BY100NY - Urban Site Complex

Hydric soil rating: No

Minor Components

Hooksan

Percent of map unit: 4 percent

Landform: Dunes

Landform position (two-dimensional): Toeslope, footslope, backslope, summit

Landform position (three-dimensional): Crest, base slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Greenbelt

Percent of map unit: 2 percent

Landform position (two-dimensional): Footslope, backslope, summit

Landform position (three-dimensional): Base slope, side slope, crest, talf

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Bigapple

Percent of map unit: 2 percent

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Talf, rise

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Fortress

Percent of map unit: 2 percent

Landform position (two-dimensional): Toeslope, backslope

Landform position (three-dimensional): Dip, talf

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 2qkkp

Elevation: 0 to 310 feet

Mean annual precipitation: 40 to 50 inches

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Mean annual air temperature: 47 to 61 degrees F

Frost-free period: 195 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: "[National Soil Survey Handbook](#)."

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3

Low: 3 to 6

Moderate: 6 to 9

High: 9 to 12

Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology)

from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasesers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasesers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2

Low: 0.2 to 0.4

Moderately low: 0.4 to 0.75

Moderate: 0.75 to 1.25

Moderately high: 1.25 to 1.75

High: 1.75 to 2.5

Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can

occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent

Low: 0.5 to 1.0 percent

Moderately low: 1.0 to 2.0 percent

Moderate: 2.0 to 4.0 percent

High: 4.0 to 8.0 percent

Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and

promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5

Extremely acid: 3.5 to 4.4

Very strongly acid: 4.5 to 5.0

Strongly acid: 5.1 to 5.5

Moderately acid: 5.6 to 6.0

Slightly acid: 6.1 to 6.5

Neutral: 6.6 to 7.3

Slightly alkaline: 7.4 to 7.8

Moderately alkaline: 7.9 to 8.4

Strongly alkaline: 8.5 to 9.0

Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
 - A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
 - B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
 - C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
 - A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
 - B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where "Rock outcrop" is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which "severely eroded," "very severely eroded," or "gullied" is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1

Moderate: 13-30:1

Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0

Coarse sand: 1.0 to 0.5

Medium sand: 0.5 to 0.25

Fine sand: 0.25 to 0.10

Very fine sand: 0.10 to 0.05

Silt: 0.05 to 0.002

Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field

generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

APPENDIX E

**Subsurface Information (Excerpts from Geotechnical Engineering Report prepared by
Mueser Rutledge Engineers PLLC)**

**DUE DILIGENCE
GEOTECHNICAL REPORT
2731 WEST 12TH STREET
NEPTUNE AVENUE / CONEY ISLAND CREEK SITE**

**2731 WEST 12TH STREET
BROOKLYN, NY**

**PROLOGIS
ONE MEADOWLANDS PLAZA, SUITE 100
EAST RUTHERFORD, NJ 07073**

May 9, 2023



LIST OF EXHIBITS

The following exhibits were prepared to illustrate this report:

Figure No. 1	Site Location Plan
Figure No. 2	Historical Maps
Figure No. 3	FEMA FIRMs
Drawing No. B-1	Boring Location Plan
Drawing No. GS-1	Geologic Section A-A
Drawing No. GS-2	Geologic Section B-B
Drawing No. GS-3	Geologic Section C-C
Drawing No. GS-4	Geologic Section C-C
Drawing No. GS-R	Geotechnical Reference Standards
Appendix A	MRCE Boring Logs
Appendix B	Historic Boring Information
Appendix C	Available Groundwater Information
Appendix D	Proposed Development Options

AVAILABLE INFORMATION AND REFERENCES

The available sources listed below were used in preparation of this report:

1. Site Management Plan (SMP) for Former Brooklyn Borough Gas Works Site, NYSDEC Site Number: 224026, prepared by GEI Consultants, Inc., P.C. (GEI), dated June 2019.
2. Periodic Review Report (11/13/21 to 11/13/22) for Former Brooklyn Borough (Coney Island) Gas Works Site, prepared by GEI, dated December 2022.
3. ALTA/NSPS Land Title Survey for 2731 12th Street, Block 7247, Lot 106, prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan), dated October 26, 2022.
4. Parking Scheme Drawings C-301 and C-302, Conceptual Grading Plan and Conceptual Drainage Plan, prepared by Langan, dated April 5, 2023.
5. Neptune Avenue, Brooklyn, FedEx Test Fit Scheme Conceptual Drawings, prepared by Gensler.
6. Neptune Avenue, Brooklyn, Multistory Warehouse, Conceptual Drawings, prepared by Gensler, dated May 3, 2022.

The references listed below were used in preparation of this report:

1. 2022 NYC Building Code

SITE AND PROJECT DESCRIPTION

The project site is located at 2731 West 12th Street in the Gravesend neighborhood of Brooklyn, New York (Block 7247, Lot 106), as shown on Figure No. 1. The lot area is about 700,000 square feet. The site is generally bounded by the Coney Island Creek to the south and east, and the Belt Parkway and underlying parking area to the north.

Other notable adjacencies to the site are as follows:

- To the south and east are two narrow lots, Lots 125 and 288. Both lots are vacant and lie along the shoreline of Coney Island Creek. The lots are titled to NYC Department of Small Business Services (SBS).
- The western limit of the site abuts Lot 30, which in turn is adjacent to a New York City Transit (NYCT) elevated viaduct carrying the N and D subway lines. Lot 30 is currently vacant and titled to the NYC Transit Authority.
- To the north, the site mostly fronts an at-grade parking lot beneath the elevated Belt Parkway viaduct, except for Lot 13 at approximately the midpoint and Lot 218 at the northeast corner. Both lots are currently vacant and owned by the NYC Department of Sanitation. North of the elevated Belt Parkway is the NYCT Coney Island train yard.

We understand that the current proposed development is an at-grade parking area with vehicular access via the parking area to the north of the site beneath the Belt Parkway. However, future development schemes include a multistory warehouse with surrounding at-grade parking and a bridge across Coney Island Creek at the southeast corner of the site connecting the proposed facility to Neptune Avenue on Coney Island.

Site History

Figure 2 shows the site in various phases of development. The 1895 Fire Insurance Map shows Coney Island Creek wrapping around the site in a similar pattern as seen today. The site is undeveloped at the time and a proposed ship canal alignment crosses the northern part of the site. The 1920 atlas shows the start of development with several buildings and circular tanks, as well as a vehicle bridge and a train bridge connecting the site to Coney Island to the south across the creek. The 2008 drawing SES-9 of abandoned structures by Severson from the site's SMP shows several former tank and building foundations that remain, while the bridges have been removed.

Site-wide soil remediation was conducted in approximately 2007 to 2008. The remediation included but was not limited to installation of a perimeter sheet pile barrier, excavation and removal of some contaminated soil, establishment of a 50-foot wide Ecological Buffer Zone at the transition from Coney Island Creek to the upland areas, and placement of a Low Permeability Multi-Component Environmental Cap with a gravel venting layer and vents throughout the upland portion of the site. The perimeter sheeting is reported to extend to Elev. -17 along the upland perimeter and to Elev. -26 along Coney Island Creek.

Datum

Elevations in this report are referenced to the North American Vertical Datum of 1988 (NAVD88).

Topography

Site topography generally ranges from about Elev. +16 near the northeast corner to Elev. +8 at the southwest corner, with sharp declines along the perimeter with Coney Island Creek to the water line.

SUBSURFACE INVESTIGATION

2023 Subsurface Investigation

MRCE prepared a due diligence investigation plan consisting of twelve (12) geotechnical borings that was submitted through Prologis and its environmental consultant, Langan, to the NYS DEC for approval. The plan was approved and required a Community Air Monitoring Plan (CAMP) to be

conducted while intrusive work was ongoing. Langan administered the CAMP and performed environmental sampling during the 2023 MRCE geotechnical investigation.

The twelve geotechnical borings, MR-1U through MR-12A, were made by Craig Geotechnical Drilling Co. of Mays Landing, New Jersey between March 27, 2023 and April 3, 2023 under the continuous inspection of MRCE Engineer Ben Jahnke.

The boring locations were laid out by survey and cleared with ground penetrating radar by others. As-drilled boring locations are shown on the attached Drawing No. B-1. A description of each geotechnical investigation component is provided below.

Geotechnical Borings

All borings were made by track-mounted drill rigs employing wash-rotary techniques. Four borings (MR-1U, MR-5, MR-7, and MR-12A) were advanced to 62 feet below grade, while the remaining eight borings were advanced to 32 feet. Steel casing and drilling mud were employed to stabilize the boreholes. Typically, four split-spoon samples were conducted in the top 10 feet of each boring, and then at 5-foot centers, thereafter.

Soil Sampling

Soil samples were obtained in general conformance with ASTM D1586 – *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils* using a two-inch outer diameter split-spoon sampler driven with a 140-pound hammer free-falling 30 inches. All borings were sampled with an automatic hammer. Hammer blows required to advance the sampler through each of four, six-inch intervals were recorded. The Standard Penetration Test (SPT) resistance expressed in blows per foot (bpf), also termed N-value, is an indication of the relative density of the material sampled and is calculated by summing the blows from the second and third six-inch drive intervals. Soil samples were classified in accordance with the Unified Soil Classification System (USCS), placed in screw-top glass jars, and delivered to our laboratory. A summary of the USCS criteria is provided on Drawing GS-R, Geotechnical Reference Standards. Boring logs are attached in Appendix A.

In addition to the SPT samples, relatively “undisturbed” tube samples of fine grained/organic soils were attempted in eight (8) of the borings using a Shelby tube sampler. Undisturbed sampling involved attaching a thin walled tube to the Shelby head and pushing the tube into the soil for a length of 24 inches using the drill rig. A total of five (5) Shelby tube samples were recovered. Upon recovery, the tubes were waxed and capped to preserve moisture and protected from the elements until shipment to our laboratory.

Borehole Closure

Upon boring completion, in accordance with the NYSDEC approved plan, all boreholes were tremie grouted with a cement-bentonite mix and the top 5-feet of each hole was backfilled with hydrated bentonite pellets. All drill tooling and sampling equipment was cleaned withalconox between holes, and all drill spoils and cleaning fluid was drummed. Drums were labeled and stored on a drum storage pad for testing and disposal by others.

Groundwater Observation

Groundwater observation wells were not included in MRCE’s investigation due to the potential contamination. Groundwater data is available in the SMP and in GEI’s periodic reports.

LABORATORY REVIEW AND TESTING RESULTS

All soil samples were delivered to the MRCE soil mechanics laboratory. Laboratory testing was not conducted due to the odor of the samples.

SUBSURFACE CONDITIONS

General descriptions of soil and rock strata encountered in the MRCE borings are listed below in order of their occurrence with depth.

Stratum F – Fill (NYC Class 7)

The uppermost material encountered in all of the borings was Stratum F - fill. Stratum F consists of medium compact to loose, brown, black, gray, and white fine to coarse sand, some silt to silty, trace gravel to gravelly, trace brick, roots, clay, mica. The fill layer includes the 38" thick surficial multimedia environmental cap which includes geotextiles, clean fill, and a gravel venting layer. The geotextile was encountered in several samples. The fill ranges from 4.5 to 13.5 feet thick and averages 9.5 feet thick. N values range from 4 to refusal and average 24.

Stratum S1 – Sand (NYC Class 3b)

A natural sand Stratum S1 was encountered below the fill in five borings (MR-3, MR-5, MR-9, MR-10U, and MR-11U). Stratum S1 consists of medium compact to loose, black or dark gray fine to coarse sand, silty to some silt, trace to some gravel, trace clay, roots. Where encountered, Stratum S1 was 4 to 9.5 feet thick. N values range from 5 to 50 and average 23.

Stratum O – Organic Clay, Silt, and Peat (NYC Class 7)

A natural organic deposit, Stratum O, was encountered in nine of the twelve borings. The three borings (MR-5, MR-9, MR-12A) that did not encounter Stratum O were at the southwest portion of the site. Where encountered, Stratum O was underlying the surficial fill or Stratum S1 with thickness ranging from 2 to 10 feet. Stratum O consists of black organic clay, silty to some silt, with peat or roots, trace to some fine to medium sand, trace gravel or gray silt to silty fine to medium sand, some to trace peat or roots, trace to some clay. SPT N values range from weight of hammer to 8 and average approximately 2.

Stratum S2 – Sand (NYC Class 3b)

All twelve borings were terminated in the underlying natural sand Stratum S2. Stratum S2 consists of loose to medium compact, gray, dark gray, and brown fine to coarse sand, some to trace silt, trace to some gravel. Stratum S2 was encountered at depths ranging from 7 to 24.5 feet below grade. N values range from 1 to 32 and average 14.

Stratum M – Clayey Silt (NYC Class 6)

One boring, MR-1U, encountered an approximately 8-foot-thick clayey silt layer within Stratum S2. Stratum M consists of gray clayey silt and the two N values recorded in this stratum are 5 and 9.

Groundwater

Available data from the 2019 SMP show that groundwater ranged from Elev. +2.5 at the upland portion of the site to Elev. +1 near Coney Island Creek. Groundwater monitoring wells are currently maintained by GEI. The most recently available Periodic Review Report by GEI dated December

2022 includes groundwater data reproduced herein as Appendix C. Groundwater elevation in the wells vary from Elev. +6.7 to +0.2 with the lowest readings typically at the shoreline. Groundwater elevation is highest near the northwest quadrant of the site and decreases towards Coney Island Creek to the south and east.

Interpretation of Subsurface Conditions

MRCE's interpretation of subsurface strata based on the investigation is presented on Drawing Nos. GS-1 through GS-4. Transitions between strata are necessary interpolations between data derived at each boring location and may not reflect actual subsurface conditions.

Flood Level

The site is within a special flood hazard area as shown on Figure No. 3. The 2007 Flood Insurance Rate Map (FIRM) and the 2015 Preliminary FIRM produced by the Federal Emergency Management Agency (FEMA) show the approximately western half of the site within Flood Zone AE, indicating a 1% annual chance of flooding. The approximately eastern half of the site is shown on both maps to be a combination of shaded and unshaded Zone X which indicates a 0.2% annual chance or less than a 0.2% chance of flooding, respectively. The extent of Zone AE on the site decreased from the 2007 map to the 2015 preliminary map likely due to changes in grade from the remediation work and additional of the environmental cap conducted in approximately 2008.

PRELIMINARY SEISMIC EVALUATION

Design of the proposed at-grade parking lot will not require a seismic evaluation, however, design of the proposed development schemes including a multistory facility and bridge over Coney Island Creek would have to comply with the seismic provisions of the 2022 New York City Building Code (Code), or the most current Code at the time of the design and development. For structures, the Code requires an evaluation of the seismic Site Class to determine the seismic design parameters.

Liquefaction Evaluation

An assessment of the liquefaction potential under the seismic event specified by the Code is necessary to evaluate the seismic Site Class. Typically, loose granular soils below the groundwater table are subject to potential liquefaction. Liquefaction susceptibility was assessed using the NYCBC Liquefaction Assessment Diagram (NYCBC Figure 1813.1), which compares SPT N-values with specified liquefaction "screening lines". The screening indicates that there is a potential for liquefaction of site soils. Additional borings supplemented with Cone Penetrating Testing (CPT) in conjunction with a site-specific evaluation will be necessary for future development and design.

Site Class

Based on the guidelines of the Code, the seismic site class is either Site Class E, Soft Soil Profile, with seismic coefficients $S_{DS} = 0.450$ and $S_{D1} = 0.171$, or Site Class F, dependent upon the results of additional borings and CPTs, and a site-specific liquefaction evaluation.

PRELIMINARY RECOMMENDATIONS: AT-GRADE PARKING

The proposed development is an at-grade parking lot with a perimeter bioretention system along the border with the Coney Island Creek. Based on the proposed site grading plans, up to three to four feet of fill is anticipated to be placed over most of the site with the existing grade cut in the northeast quadrant.

The general stratigraphy at the site based on the boring investigation and available boring information includes about 5 to 15 feet of fill overlying a 2- to 10-foot-thick compressible silt and/or organic clay over natural outwash sand. The silt/organic clay layer was not encountered in the borings to the southwest of the site (MR-5, MR-9, and MR-12).

The presence of compressible organic clay/silt at depth will result in ground settlement over time, which will require re-surfacing of the asphalt parking lot to maintain grades.

Settlement will not be uniform across the site. Settlement will be greatest in areas of maximum fill height and where the silt/organic clay layer is thickest. Little if any settlement is anticipated in areas to be cut and in the southwest quadrant, considering the silt/organic clay strata was not encountered in this area and also this is where abandoned tank foundations are present. Additional pitch in proposed drainage pipes is recommended to account for future settlement and to maintain proper drainage.

We anticipate the reuse of clean fills above the existing environmental cap. Where grade is cut, replacement of the environmental cap will be necessary, which may lead to over-excavation for a new cap and excavation and removal of contaminated soils.

Some measures can be taken to reduce the amount of settlement including limiting fill thickness, using light-weight fill, or placing surcharge fills with wick drains in advance of parking lot construction.

CONSTRUCTION CONSIDERATIONS

Soil Excavation and Support-of-Excavation

Based on the conceptual drawings, the proposed grading and bioretention system will require excavations through the fill and natural sands, which can be removed using conventional earth moving equipment. Existing intact foundations from the previous buildings and structures that may be present in the fill stratum will have to be removed using pneumatic hammers.

Temporary construction excavations in soil should be sloped as necessary for safety and stability or supported by sheeting and bracing in accordance with OSHA regulations. Open-cut excavation is permissible for shallow excavations, such as for the bioretention system or local pits within the general excavation, provided such excavation is stable and does not undermine or cause damage to adjacent structures. Where such conditions permit, the excavation sides should be sloped no steeper than 1V:1.5H in soil. Sloped excavations along public sidewalks should be protected using a thin concrete cover, minimum three inches thick, to prevent erosion and undermining of the sidewalk and/or street.

For deeper excavations, or where conditions do not permit sloped excavations, drilled-in soldier piles and timber lagging is a suitable and economical method of temporary excavation support. Lateral bracing using tiebacks or internal rakers may be required. Support of excavation must be designed by a qualified engineer experienced in SOE design.

Temporary Construction Dewatering

Proposed grading and bioretention system elevations are anticipated to be above the prevailing groundwater level, therefore, we do not anticipate significant groundwater flows into the excavations. However, the Contractor should plan to remove any water infiltration into the excavations (groundwater, precipitation, or surface run-off) by pumping from local sumps established at the base of the excavation. Surface water should be controlled by sloping grades away from the excavation to prevent water inflow.

The environmental engineer should be consulted with respect to the means and ability to pump surface water or groundwater from excavation areas.

If some areas require over-excavation for unsuitable bearing soils or to replace the environmental cap at a lower elevation, and therefore, extend below the groundwater level, sumps will be required to locally drawdown the groundwater level to maintain a dry and stable subgrade during construction.

Subgrade Preparation

Subgrade for parking lot construction must be proof-rolled using a heavy static compactor prior to sub-base and asphalt placement to determine if there any soft areas are present. If soft areas, organic soils, or deleterious materials are encountered at the slab subgrade elevation, then these areas must be over-excavated and replaced with suitable structural fill. Hard points, such as building remnants and boulders, should be removed a minimum of one foot below parking lot subgrade.

Soil subgrades must be free of standing water. All water must be diverted away from and not allowed to pond in excavations. Care should be exercised to prevent disturbing or loosening the soil in the sides and bottoms of excavations.

Final subgrade exposure in soils must be made using hand tools or a smooth-edged excavating tool, such as a backhoe bucket with the teeth shielded, and operated by reach of equipment working on mats or at least two feet above subgrade. Final subgrade should be promptly covered to protect subgrade materials from subsequent deterioration from weather, surface water infiltration and construction traffic in the interim period until parking lot construction is completed.

Backfill Requirements

Structural fill is recommended for backfilling below the proposed parking lot sub-base. Structural fill should consist of a well-graded sand, gravel, crushed rock, or a mixture of these containing no organic matter, wood, brick, or deleterious materials. Structural fill should have a maximum particle size of 3 inches and a maximum of 10 percent passing the No. 200 sieve. All fill should be placed in loose lifts not exceeding 12 inches (six inches where hand operated equipment is used), at its optimum moisture content plus or minus 3 percent, and compacted to 95 percent of Modified Proctor maximum dry density (ASTM D 1557). Lift thickness is dependent on compaction effort and should be reviewed with the contractor's compaction equipment.

Granular onsite soils are suitable for reuse as fill provided that the soils meet the above gradation requirements, are free of organic or other deleterious materials, sorted for particles larger than 3 inches, possess moisture contents suitable for compaction, and are approved by the environmental engineer for reuse. Contractors should expect some processing may be needed to the meet the requirements above. Alternatively, granular materials can be imported for fill. Onsite soils and sources of off-site borrow should be subjected to laboratory testing including grain size and moisture density tests prior to use to determine if they meet specified backfill requirements.

Light weight fills can be considered to decrease overburden loads on the underlying organic deposits and, therefore, limit future settlement.

Instrumentation and Monitoring

To establish the existing conditions of the surrounding structures, preconstruction condition surveys should be performed prior to demolition and excavation to document the existing conditions of the adjacent elevated Belt Parkway, sidewalks, and streets. This survey should include photographing existing conditions and installing crack gages over existing structural cracks where appropriate.

Monitoring of the adjacent structures for vibrations, settlement, and lateral movement during demolition and construction is required. Optical monitoring points for vertical and lateral displacements should be established on the Belt Parkway structure, the perimeter sheet pile perimeter, and on adjacent structures prior to construction and monitored on a regular basis during demolition, excavation, and parking lot construction. Seismographs should also be installed on the elevated Belt Parkway structure to measure vibration levels caused by vibration-inducing work during excavation and construction. Baseline ambient noise and vibration levels and optical monitoring point readings should be established prior to construction. The monitoring program should identify threshold and limiting values for vibrations and displacements based on the condition of the adjacent structures observed during pre-construction inspections.

Additional instrumentation and monitoring may be necessary due to the proximity of the site to the NYCT Coney Island Yard and elevated [D]-train viaduct.

NYCT Considerations

New York City Transit (NYCT) requires support of excavation and structural plans be submitted for review and approval prior to construction for projects within 200 feet of NYCT structures. The proposed parking lot is within 200 feet of NYCT structures on the north and west sides, therefore, a submittal to NYCT for review is required. This should be done early in the design process as the duration of review is uncertain.

NYCBC Special Inspection Requirements

The following items related to construction of foundation elements are subject to NYCBC Special Inspection by a registered professional engineer.

1. Excavation – Sheeting, Shoring, and Bracing
2. Subsurface Conditions – Fill Placement & In-Place Density

FUTURE PROPOSED MULTISTORY WAREHOUSE DEVELOPMENT

We understand several development schemes including a multistory warehouse and a bridge over Coney Island Creek are being considered. A more robust subsurface investigation to satisfy NYCBC requirements and provide adequate information for foundation design is required for any proposed development. Proposed development options currently being considered are included in Appendix D.

Additional Subsurface Investigation

Due to the underlying soft organic deposits, deep foundations consisting of piles is anticipated for future development of the site. For deep foundations, the Code requires at least one boring for every 2,000 square feet for built up areas up to 20,000 square feet and one boring for each additional 4,000 square feet in excess of 20,000 square feet. Up to half of the borings may be substituted for CPTs at a 2 to 1 ratio. For example, the May 3, 2022 Multistory Warehouse option includes a built over area of approximately 240,000 square feet. A development of this size on deep foundations would require

65 borings, or a combination of 33 borings and 48 CPTs. Additional borings and CPTs would be required for the bridge. Due diligence borings conducted within 25-feet of the building footprint may be included to satisfy Code requirements for the number of borings.

CPTs are recommended as they typically provide cost savings compared to borings and provide additional in-situ data for the organic deposits and lower sands to aid in design. In-situ seismic testing can be performed with CPTs to aid in determining the seismic site class and liquefaction potential.

Column and Floor Slab Support

We anticipate that columns may be supported on deep foundations bearing in the natural sand stratum or deeper. Columns may be supported on pile groups while a structural slab may be supported on a grid of individual piles. Alternatively, ground improvement may be conducted for a slab-on-grade. Due to the contamination on site and underlying natural sands full displacement piles may be the most effective and efficient method of deep foundation support. Full displacement piles utilize a continuous flight auger with little to no excavation spoils, and the augered hole is filled with concrete potentially tying in to the existing environmental cap. Connection to the environmental cap would have to be confirmed with the environmental engineer. Depending upon access to the near and far sides of the creek, the bridge may also be supported on full displacement piles.

The environmental cap should be below the pile caps or structural slab to avoid areas of sharp differential settlement that may tear the geotextiles and create discontinuities.

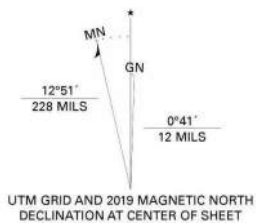
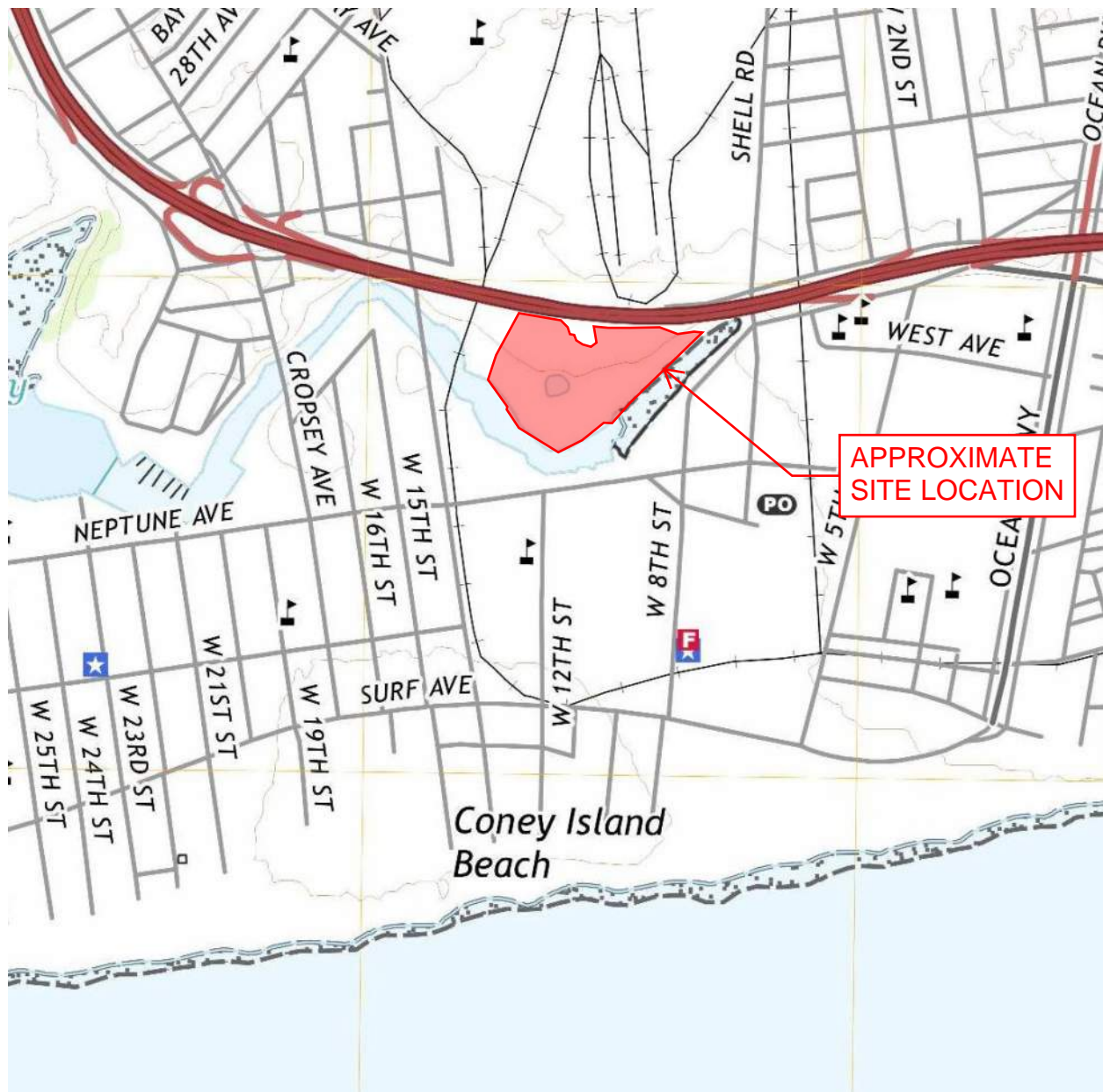
A pile load test program is required to confirm the pile design prior to production piles being installed.

GEOTECHNICAL REVIEW OF DESIGN & CONSTRUCTION

Recommendations for design and construction in this report are based on the information obtained from the borings and available subsurface information. However, conditions on the site may vary between discrete boring locations and observed at the time of the subsurface explorations. The nature and extent of variations between borings may not become evident until exposed in construction.

Geotechnical observation of excavation and construction is recommended to provide an opportunity to observe soil conditions and behavior as exposed during construction, evaluate the applicability of the recommendations provided in this report to the conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein. We recommend that all foundation construction and subgrade preparation be observed by a qualified geotechnical engineer.

EXHIBITS



CONTOUR INTERVAL 5 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

SOURCE:
USGS TOPOGRAPHIC QUADRANGLE CONEY
ISLAND, NY, NJ, DATED 2019.

SITE LOCATION PLAN

2731 WEST 12TH STREET



MUESER RUTLEDGE CONSULTING ENGINEERS PLLC

14 PENN PLAZA - 225 WEST 34TH STREET, NEW YORK, NY 10122

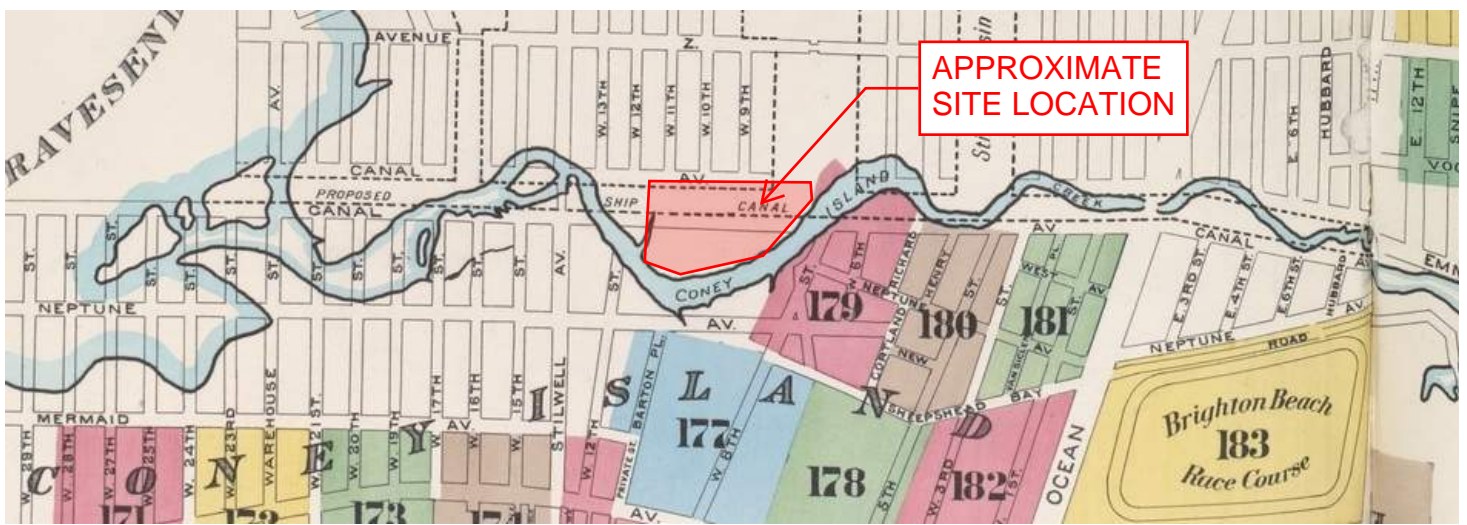
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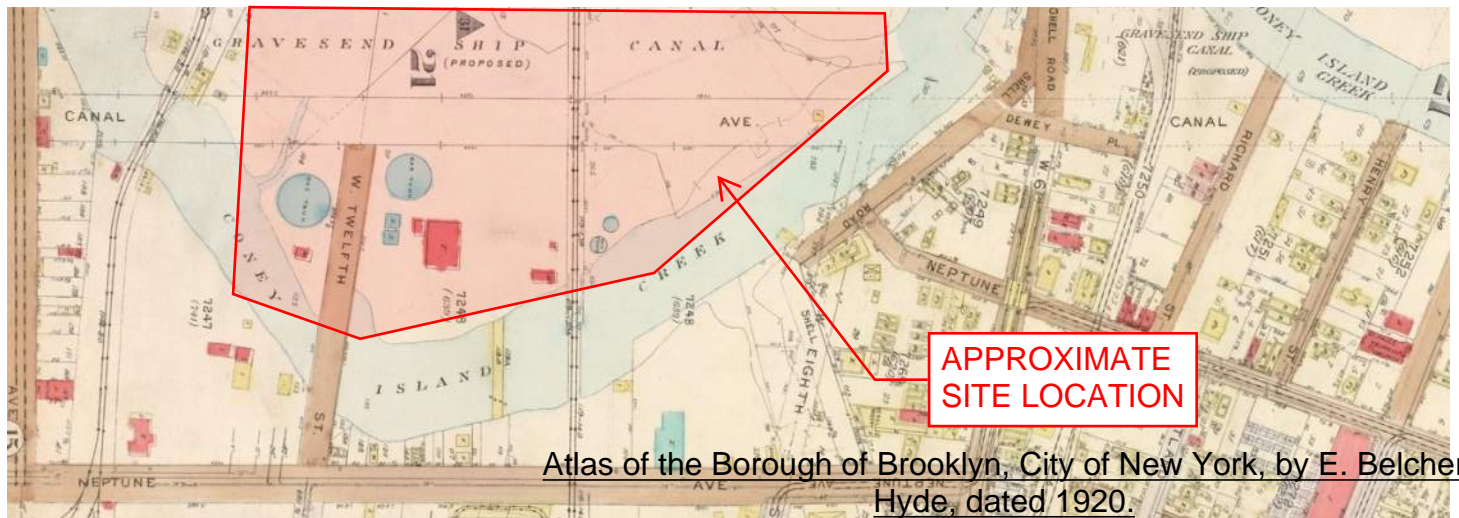
DATE: 04-11-2023

FILE NUMBER: 14466

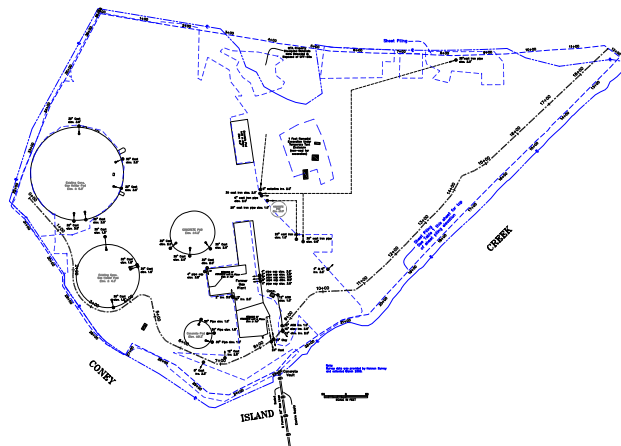
DRAWING NUMBER: FIGURE 1



Sanborn Fire Insurance Map of Brooklyn New York Suburbs, dated 1895



Atlas of the Borough of Brooklyn, City of New York, by E. Belcher Hyde, dated 1920.



Drawing SES-9, Location & Elevation of Abandoned Pipes, Relief Holders & Other Below Grade Structures, by Severson Environmental Services, Inc. dated 11/04/08.

SITE HISTORY

2731 WEST 12TH STREET



MUESER RUTLEDGE CONSULTING ENGINEERS PLLC

14 PENN PLAZA - 225 WEST 34TH STREET, NEW YORK, NY 10122

MADE BY: PED

CH'KD BY:

DATE: 04-11-2023

FILE NUMBER: 14466

DRAWING NUMBER: FIGURE 2

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

- OTHER FLOOD AREAS**
 - ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

- OTHER AREAS**
 - ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
 - ZONE D** Areas in which flood hazards are undetermined, but possible.

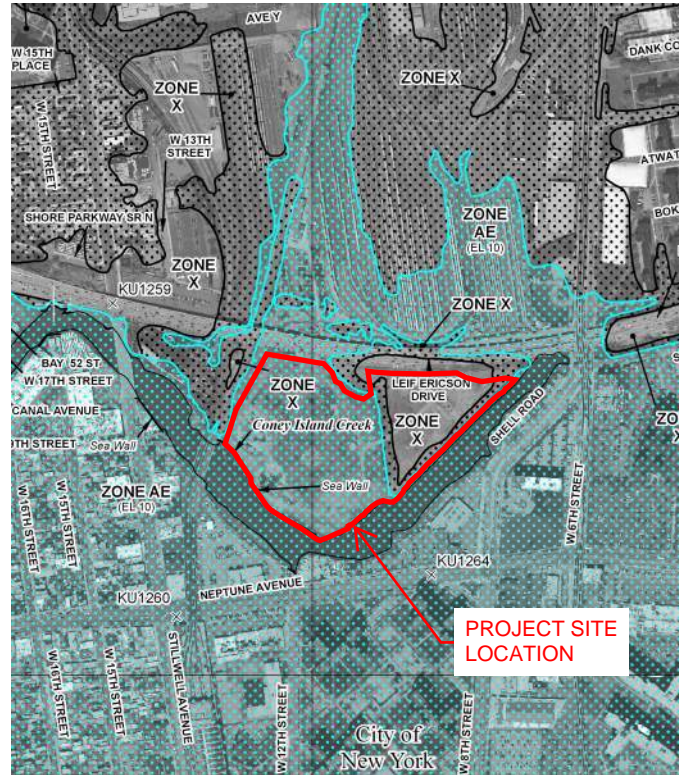
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**

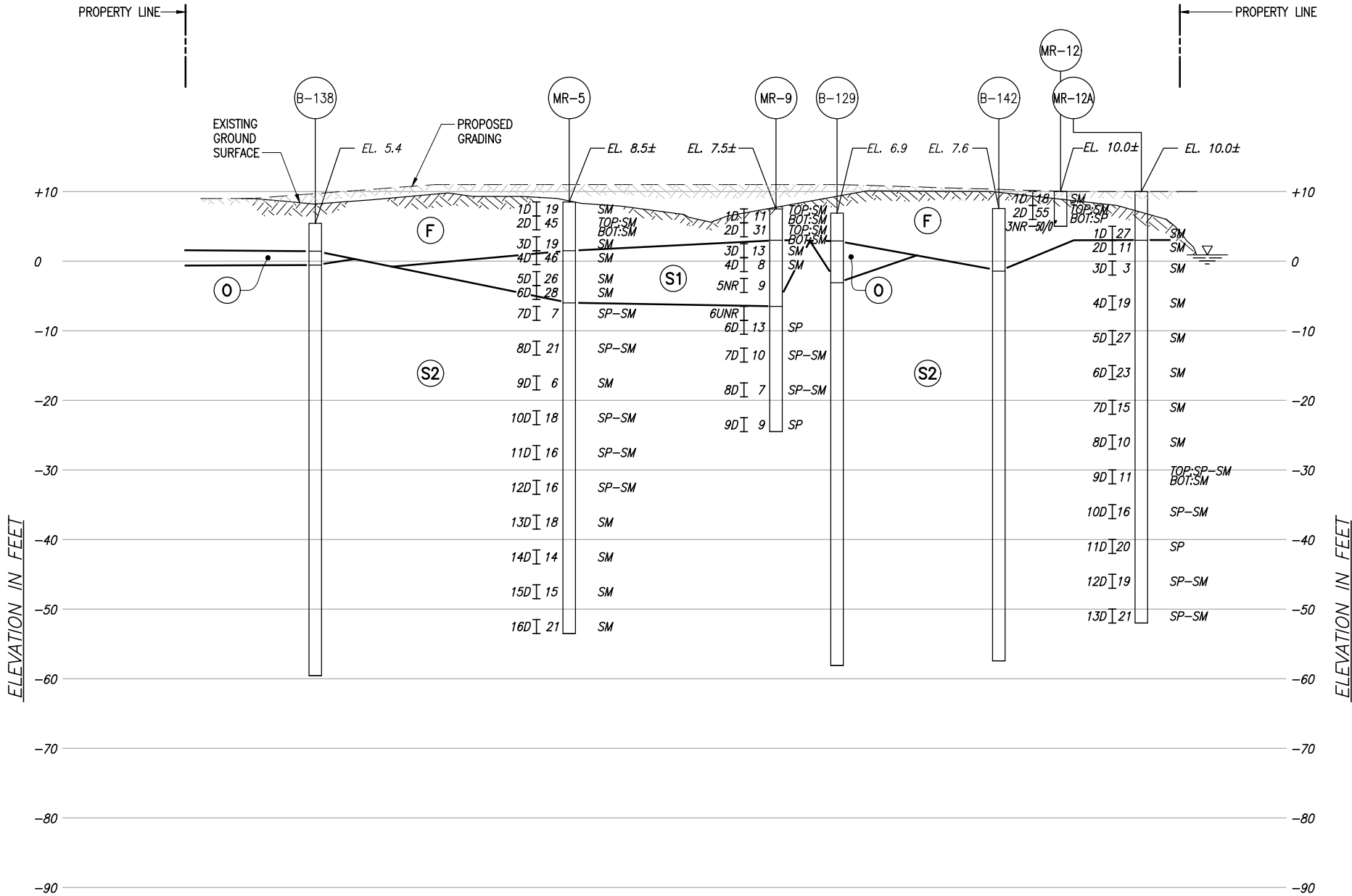
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

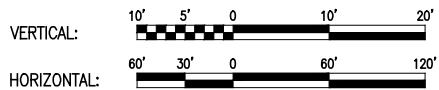
* Referenced to the North American Vertical Datum of 1988

- Cross section line
- Traverse line
- Culvert, Flume, Penstock or Aqueduct
- Road or Railroad Bridge
- Footbridge
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid values, zone 18
- 5000-foot grid values: New York State Plane coordinate system, Long Island zone (FIPSZONE 3104), Lambert Conformal Conic projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- DX5510 x
- M 1.5 River Mile





SECTION A-A



NOTES:

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GENERAL STRATA DESCRIPTIONS:

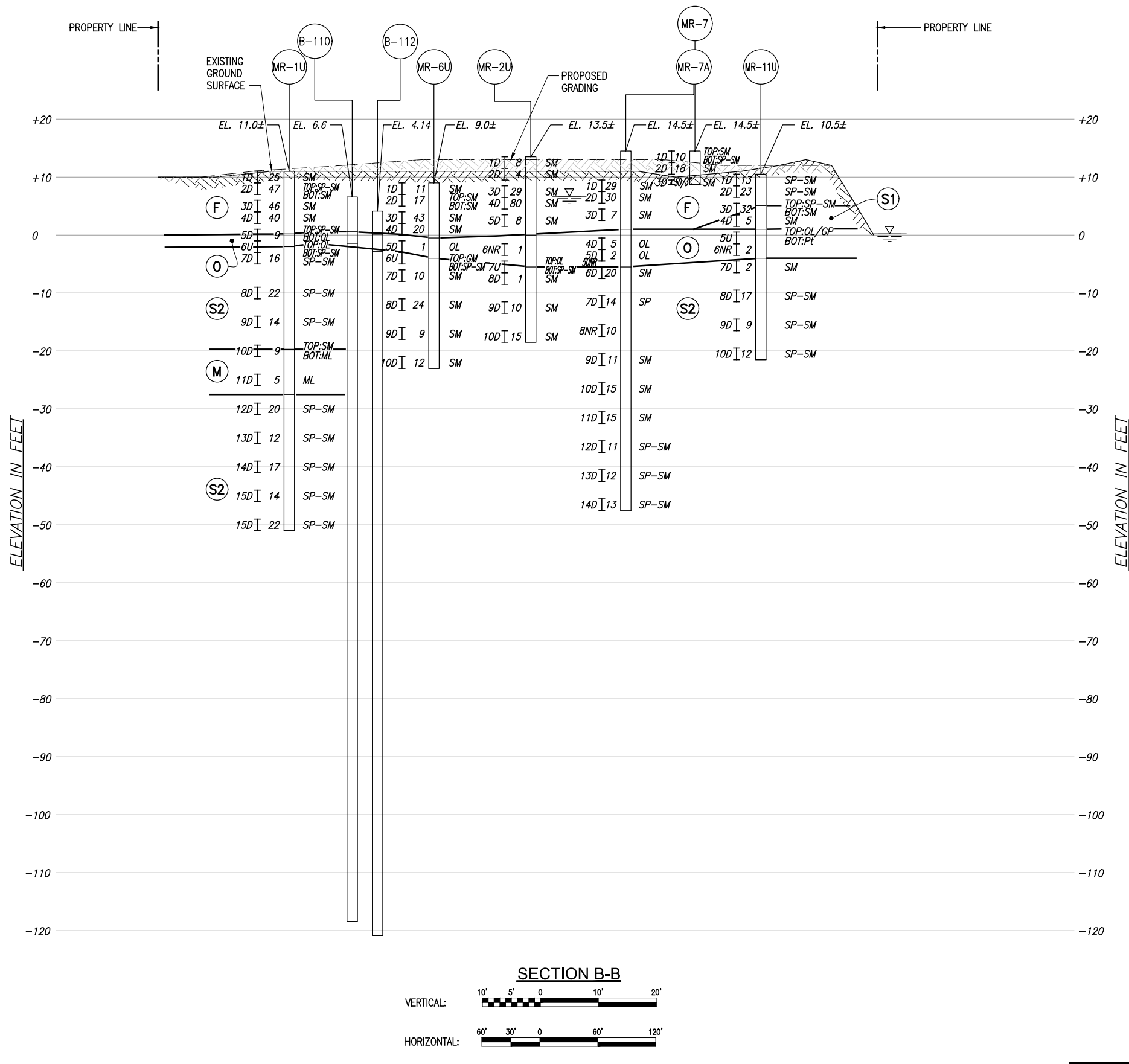
- (F)** **FILL** - MEDIUM COMPACT TO LOOSE, BROWN, BLACK, GRAY, AND WHITE FINE TO COARSE SAND, SOME SILT TO SILTY, TRACE GRAVEL TO GRAVELLY, TRACE BRICK, ROOTS, CLAY, MICA. STRATUM F INCLUDES A SURFICIAL 38-INCH THICK MULTIMEDIA ENVIRONMENTAL CAP.
- (S1)** **SAND** - MEDIUM COMPACT TO LOOSE, BLACK OR DARK GRAY FINE TO COARSE SAND, SILTY TO SOME SILT, TRACE TO SOME GRAVEL, TRACE CLAY, ROOTS
- (O)** **ORGANIC CLAY, SILT, AND PEAT** - BLACK ORGANIC CLAY, SILTY TO SOME SILT, WITH PEAT OR ROOTS, TRACE TO SOME FINE TO MEDIUM SAND, TRACE GRAVEL OR GRAY SILT TO SILTY FINE TO MEDIUM SAND, SOME TO TRACE PEAT OR ROOTS, TRACE TO SOME CLAY
- (M)** **CLAYEY SILT** - GRAY CLAYEY SILT
- (S2)** **SAND** - LOOSE TO MEDIUM COMPACT, GRAY, DARK GRAY, AND BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, TRACE TO SOME GRAVEL

REV.	DATE	BY	DESCRIPTION
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BROOKLYN			NEW YORK
PROLOGIS			
EAST RUTHERFORD			NEW JERSEY
MUESER RUTLEDGE CONSULTING ENGINEERS PLLC			
14 PENN PLAZA - 225 WEST 34TH STREET, NEW YORK, NY 10122			
SCALE GRAPHIC	MADE BY: L.R. CH'KD BY: P.E.D.	DATE: 05-05-2023 DATE: 05-05-2023	FILE NUMBER 14466
GEOLOGIC SECTION A-A			DRAWING NUMBER GS-1

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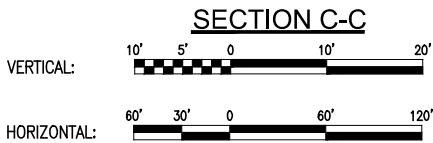
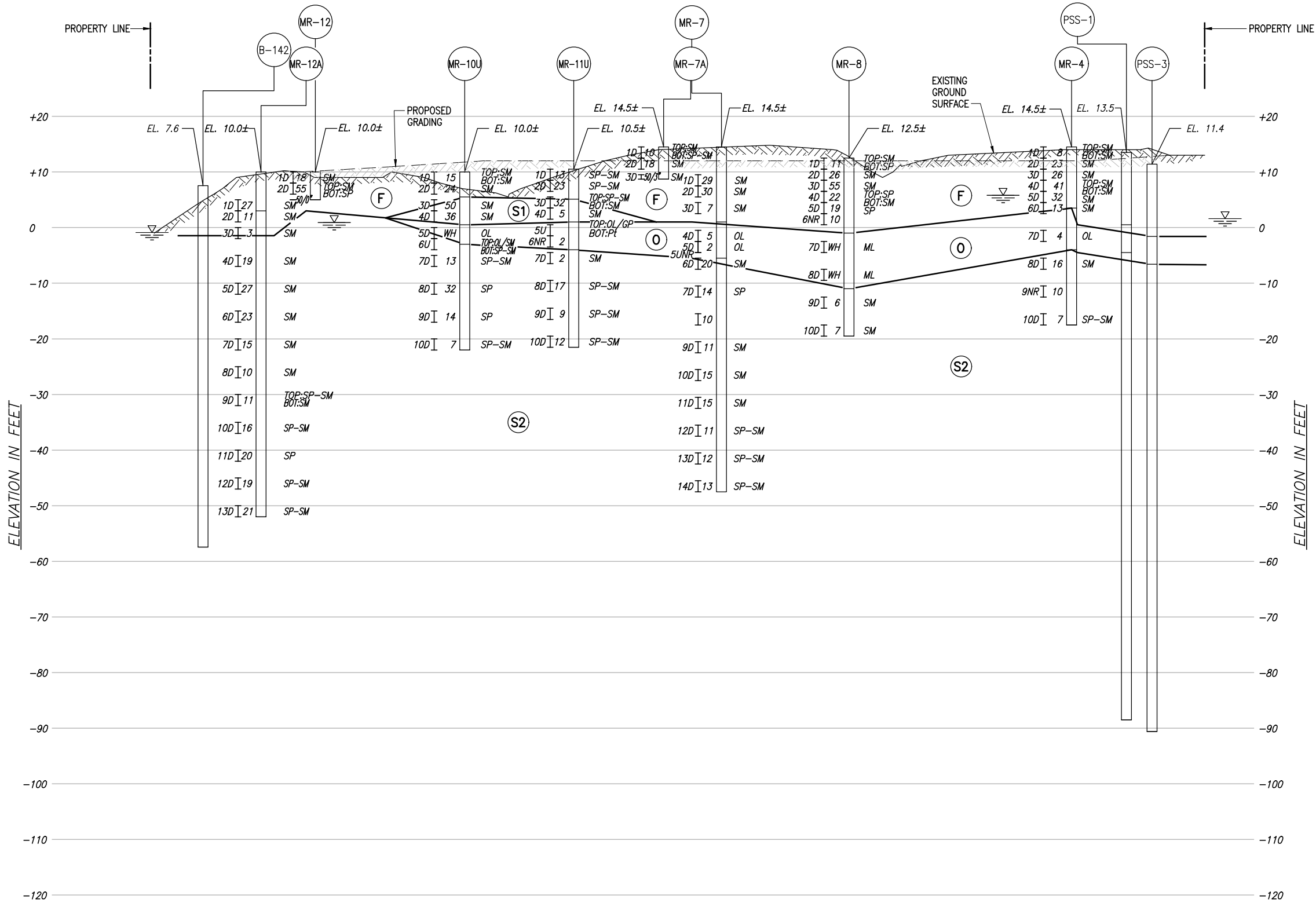
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GEOLOGIC SECTION B-B			DRAWING NUMBER
			GS-2

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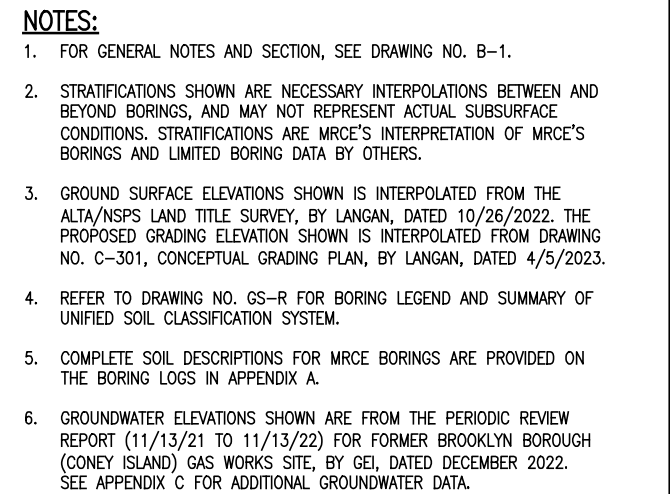
GENERAL STRATA DESCRIPTIONS:

- (F) **FILL** - MEDIUM COMPACT TO LOOSE, BROWN, BLACK, GRAY, AND WHITE FINE TO COARSE SAND, SOME SILT TO SILTY, TRACE GRAVEL TO GRAVELLY, TRACE BRICK, ROOTS, CLAY, MICA. STRATUM F INCLUDES A SURFICIAL 38-INCH THICK MULTIMEDIA ENVIRONMENTAL CAP.
- (S1) **SAND** - MEDIUM COMPACT TO LOOSE, BLACK OR DARK GRAY FINE TO COARSE SAND, SILTY TO SOME SILT, TRACE TO SOME GRAVEL, TRACE CLAY, ROOTS
- (O) **ORGANIC CLAY, SILT, AND PEAT** - BLACK ORGANIC CLAY, SILTY TO SOME SILT, WITH PEAT OR ROOTS, TRACE TO SOME FINE TO MEDIUM SAND, TRACE GRAVEL OR GRAY SILT TO SILTY FINE TO MEDIUM SAND, SOME TO TRACE PEAT OR ROOTS, TRACE TO SOME CLAY
- (M) **CLAYEY SILT** - GRAY CLAYEY SILT
- (S2) **SAND** - LOOSE TO MEDIUM COMPACT, GRAY, DARK GRAY, AND BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, TRACE TO SOME GRAVEL

REV.	DATE	BY	DESCRIPTION
2731 WEST 12TH STREET			
BROOKLYN			NEW YORK
PROLOGIS			
EAST RUTHERFORD			NEW JERSEY
MUESER RUTLEDGE CONSULTING ENGINEERS PLLC			
14 PENN PLAZA - 225 WEST 34TH STREET, NEW YORK, NY 10122			
SCALE	MADE BY: L.R.	DATE: 05-05-2023	FILE NUMBER
GRAPHIC	CH'KD BY: P.E.D.	DATE: 05-05-2023	14466
GEOLOGIC SECTION C-C			DRAWING NUMBER
			GS-3

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F **FILL** – MEDIUM COMPACT TO LOOSE, BROWN, BLACK, GRAY, AND WHITE FINE TO COARSE SAND, SOME SILT TO SILTY, TRACE GRAVEL TO GRAVELLY, TRACE BRICK, ROOTS, CLAY, MICA. STRATUM F INCLUDES A SURFICIAL 38-INCH THICK MULTIMEDIA ENVIRONMENTAL CAP.

S1 **SAND** – MEDIUM COMPACT TO LOOSE, BLACK OR DARK GRAY FINE TO COARSE SAND, SILTY TO SOME SILT, TRACE TO SOME GRAVEL, TRACE CLAY, ROOTS

O **ORGANIC CLAY, SILT, AND PEAT** – BLACK ORGANIC CLAY, SILTY TO SOME SILT, WITH PEAT OR ROOTS, TRACE TO SOME FINE TO MEDIUM SAND, TRACE GRAVEL OR GRAY SILT TO SILTY FINE TO MEDIUM SAND, SOME TO TRACE PEAT OR ROOTS, TRACE TO SOME CLAY

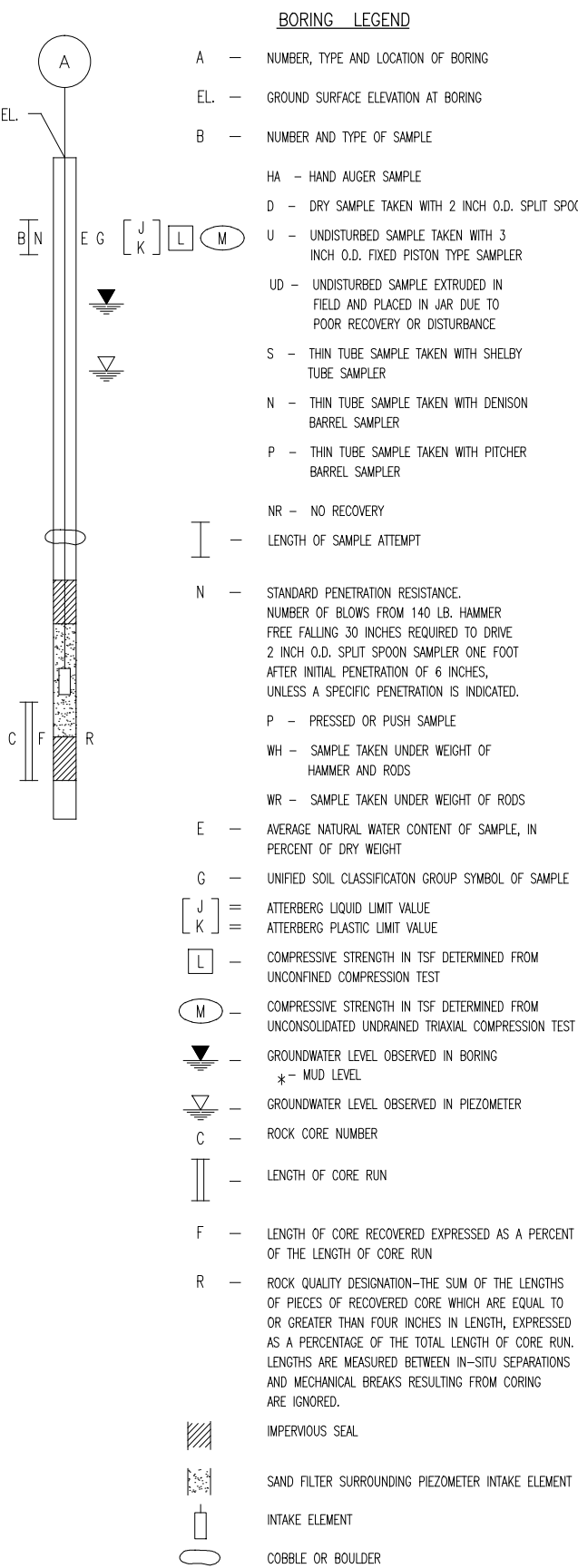
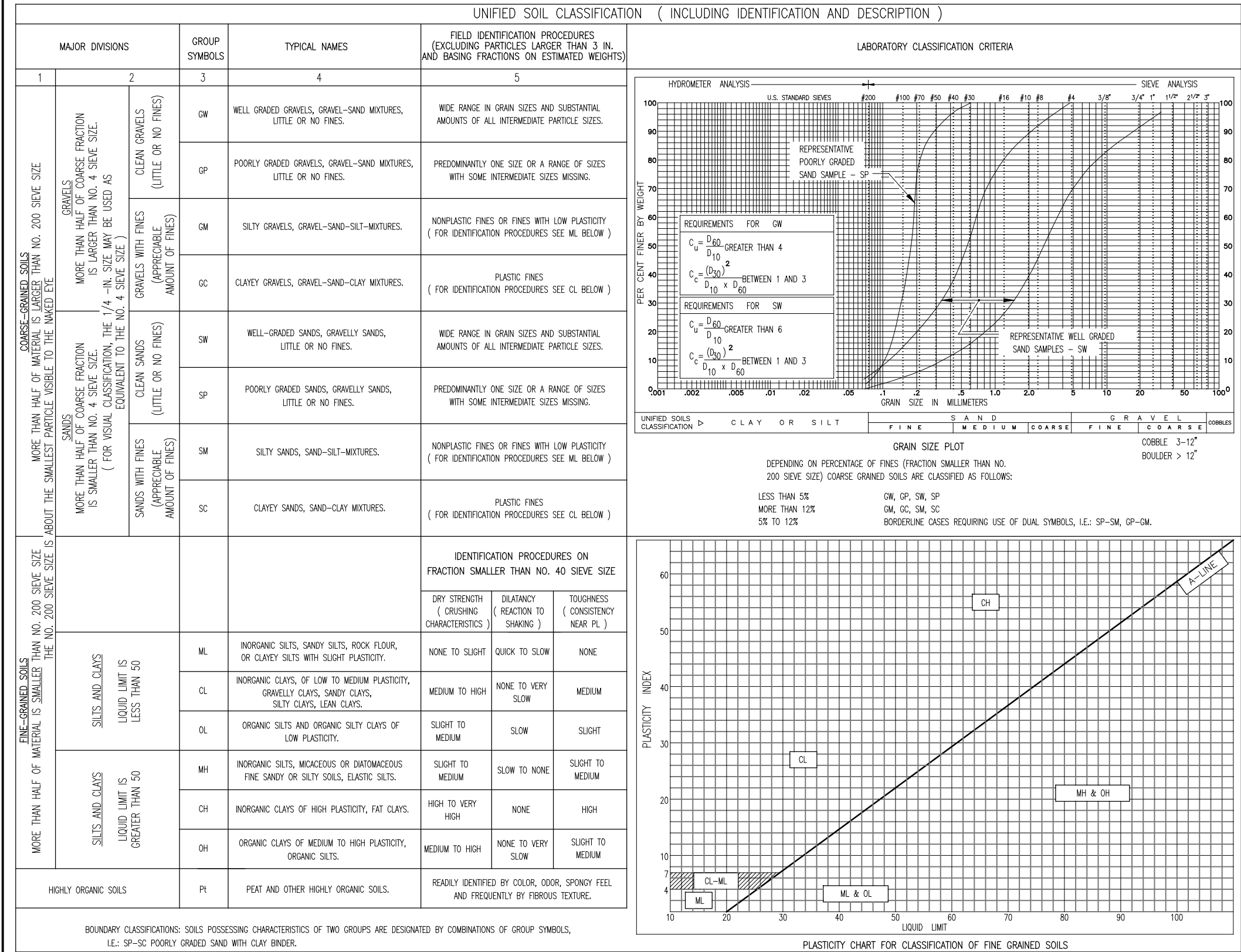
M **CLAYEY SILT** – GRAY CLAYEY SILT

S2 **SAND** – LOOSE TO MEDIUM COMPACT, GRAY, DARK GRAY, AND BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, TRACE TO SOME GRAVEL

REV.	DATE	BY	DESCRIPTION
2731 WEST 12TH STREET			
BROOKLYN			NEW YORK
PROLOGIS			
EAST RUTHERFORD			NEW JERSEY
MUESER RUTLEDGE CONSULTING ENGINEERS PLLC			
14 PENN PLAZA - 225 WEST 34TH STREET, NEW YORK, NY 10122			
SCALE	MADE BY: L.R.	DATE: 05-05-2023	FILE NUMBER
GRAPHIC	CH'KD BY: P.E.D.	DATE: 05-05-2023	14466
GEOLOGIC SECTION D-D			DRAWING NUMBER
			GS-4

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REVISED 10-25-2012

MUESER RUTLEDGE CONSULTING ENGINEERS
225 WEST 34th STREET — 14 PENN PLAZA
NEW YORK, NY 10122

GEOTECHNICAL REFERENCE STANDARDS

DRAWING NO.

GS-R

TERMINOLOGY USED IN MRCE SOIL DESCRIPTIONS

DEGREE OF COMPACTION FOR NON-PLASTIC SOIL		CONSISTENCY OF CLAY AND CLAYEY SILT ⁺			DESCRIPTION OF CONSTITUENT PERCENTAGES AS USED IN SOIL SAMPLE CLASSIFICATIONS
DEGREE OF COMPACTION	BLOWS* PER FOOT	CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TSF)	IDENTIFICATION CHARACTERISTICS	
LOOSE	0 TO 10	SOFT	LESS THAN 0.5	EASILY REMOLDED WITH SLIGHT FINGER PRESSURE	1% TO 12% — "TRACE" 13% TO 30% — "SOME" 31% TO 49% — ADJECTIVE FORM OF SOIL GROUP (EG. SANDY) EQUAL AMOUNT — "AND" (EG. SAND AND GRAVEL)
MEDIUM COMPACT	11 TO 29	MEDIUM	0.5 TO 1.0	REQUIRES SUBSTANTIAL PRESSURE FOR REMOLDING	
COMPACT	30 TO 50	STIFF	1.0 TO 4.0	DIFFICULT TO REMOLD WITH FINGERS	
VERY COMPACT	GREATER THAN 50	HARD	GREATER THAN 4.0	CANNOT BE REMOLDED WITH FINGERS	
* STANDARD PENETRATION RESISTANCE USING 140 LB. HAMMER FREE FALLING 30 INCHES TO DRIVE A 2 INCH O.D. SPLIT-SPOON SAMPLER.		+ NONPLASTIC SILTS ARE DESCRIBED USING DEGREE OF COMPACTION AS PRESENTED FOR NON-PLASTIC SOIL.			

APPENDIX A

MRCE BORING LOGS

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-1U
SHEET 1 OF 3
FILE NO. 14466
SURFACE ELEV. +11.0±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
08:40 04-03-23 Monday Sunny 45°F	1D	0.0	2-6	Gray brown fine to coarse sand, some gravel, silt, trace mica (Fill) (SM) Top 13": Brown fine to coarse sand, some gravel, trace roots, silt (Fill) (SP-SM) Bot 5": Brown silty f-c sand, trace gravel (SM) Black silty fine to coarse sand, trace roots, gravel (Fill) (SM) Black silty fine to coarse sand, trace gravel (Fill) (SM)	F		DRILLED	Topsoil from 0' to 0.5'. 2D Top: Contained geotextile. Odor. Odor.
		2.0	19-16				AHEAD	
	2D	2.0	17-17				4"	
		4.0	30-50					
	3D	5.0	29-22			5		
		7.0	24-24					
	4D	7.0	27-16					
		9.0	24-22					
						10		
	5D	10.0	10-7			10.8		
		12.0	2-2	Top 10": Blk f-c sand, sm gvl, tr silt (Fill) (SP-SM) Bot 2": Black brown silty clay, trace roots (OL) Top: Black peat, some c-f sand, sm gravel (Pt) Bot: Gray fine to medium sand trace silt (SP-SM) Gray fine to coarse sand, trace silt (SP-SM)	O			
	6U	12.0	PUSH=24"			13		
		14.0	REC=23"					
	7D	14.0	2-6			15		
		16.0	10-9					
						20		
	8D	20.0	9-10		S2			
		22.0	12-11					
						25		
	9D	25.0	10-7					
		27.0	7-6					
						30		
	10D	30.0	3-4		M	30.7		
		32.0	5-4					
						35		
	11D	35.0	1-2					
		37.0	3-2					
						38.5		
						40		
	12D	40.0	12-9	Gray fine to coarse sand, trace gravel, silt (SP-SM) Do 12D (SP-SM)	S2			
		42.0	11-12					
						45		
	13D	45.0	6-5					
		47.0	7-8					
						50		



BORING NO.	MR-1U
SHEET 2 OF	3
FILE NO.	14466
RFACE ELEV.	+11.0±
RES. ENGR.	BENJAMN JAHNKE

BORING NO.	MR-1U
SHEET 2 OF	3
FILE NO.	14466
SURFACE ELEV.	+11.0±
RES. ENGR.	BENJAMN JAHNKE

MRCE Form BL-1

BORING NO. MR-1U

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-1U
SHEET 3 **OF** 3
FILE NO. 14466
SURFACE ELEV. +11.0±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 10
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER 3" O. D. SHELBY TUBE TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 62 NO. OF 3" SHELBY TUBE SAMPLES 1
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER NICK BEEHLER **HELPERS** MILES NEIPERT
REMARKS BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 04-03-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-2U
SHEET 1 OF 2
FILE NO. 14466
SURFACE ELEV. +13.5±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS	
10:00	1D	0.0	2-4	Brown fine to coarse sand, some silt, gravel, trace bricks, roots (Fill) (SM)	F		DRILLED	Topsoil at surface.
03-31-23		2.0	4-3				AHEAD	
Friday	2D	2.0	2-2				4"	Contained geotextile.
Overcast		4.0	2-4					
40°F				5				
	3D	5.0	5-9					
		7.0	20-33					
	4D	7.0	30-40	Gray black silty fine to coarse sand, some gravel, trace brick (Fill) (SM)				
		9.0	40-50					
						10		
	5D	10.0	6-3					
		12.0	5-14					
					13.5			
	6NR	15.0	WH/12"	O	15	▼	No recovery	
		17.0	1-1					
	7U	18.0	PUSH=24"	Top: Black organic silty clay, some peat (OL) Bot: Gray fine sand, trace silt (SP-SM)	19		Driller noticed clay in cuttings at 18'; sent tube in hole at 18'.	
		20.0	REC=24"		20			
	8D	20.0	WH/12"					
		22.0	1/12"					
	9D	25.0	6-5	Gray fine to coarse sand, some silt (SM)	25			
		27.0	5-7					
					30			
	10D	30.0	4-7	Do 9D (SM)			End of Boring at 32'.	
11:40		32.0	8-10		32			
					35			
					40			
					45			
					50			

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-2U
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +13.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 15
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER 3" O. D. SHELBY TUBE TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 32 NO. OF 3" SHELBY TUBE SAMPLES 1
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-31-22

CLASSIFICATION CHECK:

-

TYPING CHECK:

PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-3
SHEET 1 OF 2
FILE NO. 14466
SURFACE ELEV. +16.0±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
13:00	1D	0.0	2-4	Top 7": Brown f-m sand, sm silt, tr roots(Fill)(SM)	F		DRILLED	Noticeable fume.
03-27-23		2.0	4-5	Bot 7": Gray blk f-c sa, sm si, gvl, tr mica(Fill)(SM)			AHEAD	
Monday	2D	2.0	4-8	Black gray fine to coarse sand, some gravel,			4"	
Sunny		4.0	8-20	silt, trace roots (Fill) (SM)				
50°F	3D	4.0	12-5	Gray black, white fine to coarse sand, some		5		
		6.0	6-7	gravel, silt, trace brick (Fill) (SM)				
	4D	6.0	20-11	Do 3D (Fill) (SM)				
		8.0	15-12					
	5D	8.0	10-9	Gray black, white fine to coarse sand, some		10		
		10.0	14-24	gravel, silt (Fill) (SM)				
13:30	6D	10.0	16-10	Do 3D (Fill) (SM)	S1			Slick sheen odor.
		12.0	8-11					
08:00						13.5		
03-28-23						15		
Tuesday					O	18.5		No recovery in tube; followed with split spoon at 22', no recovery in split spoon.
Overcast	7D	15.0	7-7	Black fine to coarse sand, some silt, gravel		20		
45°F		17.0	6-7	(SM)				
	8D	20.0	4-5	Dark gray silty fine to medium sand, some clay,	S2			REC=6"
		22.0	3-2	trace roots (ML)				
	9UNR	22.0	PUSH=24"	No recovery		24.5		
		24.0	REC=0"					
	10D	25.0	5-5	Gray fine to coarse sand, some gravel (SP)				End of Boring g at 32'.
		27.0	5-5					
						30		
09:30	11D	30.0	3-3	Gray fine to coarse sand, some gravel, silt		32		
		32.0	5-5	(SP-SM)				
						35		
						40		
						45		
						50		

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-3
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +16.0±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 20
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☐ YES ☒ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER 3" O. D. SHELBY TUBE TYPE OF DRILLING MUD
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER MIKE TARTER **HELPERS** JIMMY MARTINEZ
REMARKS UNSUCCESSFUL ATTEMPT OF RETRIEVING UNDISTURBED SAMPLE FROM 22' TO 24'.
BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX, CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 04-03-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON
BORING NO. MR-3

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-4
SHEET 1 OF 2
FILE NO. 14466
SURFACE ELEV. +14.5±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
09:00 03-27-23 Monday Sunny 50°F	1D	0.0	WH-2	Top 6": Brn f-m sand, sm silt, tr roots(Fill) (SM)	F		DRILLED	
		2.0	6-12	Bot 6":Brn gray f-c sa, sm gvl, si, tr brk (Fill) (SM)			AHEAD	
	2D	2.0	11-8	Brown gray fine to coarse sand, some gravel,			4"	
		4.0	15-20	mica, silt, trace roots (Fill) (SM)				
	3D	4.0	10-11	Brown black fine to coarse sand, some silt,		5		
		6.0	15-12	trace brick, gravel (Fill) (SM)				
	4D	6.0	25-18	Top 6": Do 3D (Fill) (SM)				
		8.0	23-15	Bot 6": Wht gray f-c sand, sm si, quartz(Fill)(SM)				
	5D	8.0	10-16	Brown, black, white, gray, red fine to coarse		10		
		10.0	16-10	sand, some silt, gravel, brick (Fill) (SM)		11		
	6D	10.0	11-11	Black gravelly fine to coarse sand, some silt (SM)				
		12.0	2-2					
					O			REC=5"
	7D	15.0	4-2	Black organic clay, some silt, trace roots (OL)		15		
		17.0	2-2					
						18.5		
12:15	8D	20.0	4-8	Dark gray fine to coarse sand, some silt (SM)	S2	20	▼	REC=5"
		22.0	8-8					
	9NR	25.0	7-6	No recovery		25		
		27.0	4-4					
	10D	30.0	6-3	Dark gray fine to medium sand, trace silt (SP-SM)		30		
		32.0	4-5			32		
								REC=2" End of Boring at 32'.
						35		
						40		
						45		
						50		

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-4
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +14.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 20
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☐ YES ☒ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN.
U-SAMPLER TYPE OF DRILLING MUD
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 32 NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER MIKE TARTER **HELPERS** JIMMY MARTINEZ
REMARKS BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 03-27-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-5
SHEET 1 OF 3
FILE NO. 14466
SURFACE ELEV. +8.5±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	CASING		REMARKS	
	NO.	DEPTH	BLOWS/6"			DEPTH	BLOWS		
11:20 04-03-23 Monday Sunny 45°F	1D	0.0	2-9	Brown gray fine to coarse sand, some gravel, trace silt, mica (Fill) (SM) Top 8": Brown gray fine to coarse sand, some gravel, trace silt (Fill) (SM) Bot 8": Blk silty f-c sand, trace gravel (Fill) (SM) Black silty fine to coarse sand, some gravel, trace root (Fill) (SM) Do 3D (Fill) (SM)	F		DRILLED	Topsoil from 0' to 0.5'.	
		2.0	10-6				AHEAD		
	2D	2.0	8-25				4"		
		4.0	20-15			5	↓		
	3D	5.0	6-9					Odor.	
		7.0	10-8			7			
	4D	7.0	19-21					Odor.	
		9.0	25-33						
	5D	10.0	9-14		Black gray fine to coarse sand, some gravel, silt (Fill) (SM) Do 5D (Fill) (SM)	S1	10		Odor; oil stains.
		12.0	12-13						
	6D	12.0	15-16						Odor; oil stains.
		14.0	12-10						
							14.5		
	7D	15.0	3-2	Gray fine to coarse sand, trace silt (SP-SM)	S2			Odor; oil stains.	
		17.0	5-5						
						20			
	8D	20.0	8-10						
		22.0	11-10						
	9D	25.0	4-3	Gray fine to coarse sand, some silt, trace gravel (SM)					
		27.0	3-6						
						30			
	10D	30.0	8-9	Gray fine to coarse sand, trace gravel, silt (SP-SM)					
		32.0	9-9						
						35			
11D	35.0	7-7	Do 10D (SP-SM)						
	37.0	9-8							
				40					
12D	40.0	7-8	Do 10D (SP-SM)						
	42.0	8-8							
				45					
13D	45.0	6-7	Gray fine to coarse sand, some silt (SM)						
	47.0	11-11							
				50					



RES. ENGR. BENJAMN JAHNKE

BORING NO. MR-5

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-5
SHEET 3 **OF** 3
FILE NO. 14466
SURFACE ELEV. +8.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 5
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.
*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER NICK BEEHLER **HELPERS** MILES NEIPERT
REMARKS BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 04-03-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-6U
SHEET 1 OF 2
FILE NO. 14466
SURFACE ELEV. +9.0±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
12:15 03-31-23 Friday Overcast 40°F	1D	0.0	2-6	Gray black fine to coarse sand, some silt, gravel, trace mica (Fill) (SM) Top 7": Do 1D (Fill) (SM) Bot 7": Gray gravelly fine to coarse sand, some silt (Fill) (SM) Gray silty fine to coarse sand, some gravel (Fill) (SM) Black gravelly fine to coarse sand, some silt (Fill) (SM) Black sandy silt, trace clay, roots (OL) Top: Black fine sandy gravel, some silt (GM) Bot: Gray fine to medium sand, tr silt (SP-SM) Gray fine to coarse sand, some silt (SM) Gray fine to coarse sand, some silt (SM) Gray brown fine to coarse sand, some gravel, silt (SM) Gray fine to coarse sand, some silt (SM)	F		DRILLED	Topsoil from 0' to 0.7'. Odor. Oil covered; odor. Oil covered; odor. Oil stains. End of Boring at 32'.
		2.0	5-5				AHEAD	
	2D	2.0	3-7				4"	
		4.0	10-17					
	3D	5.0	9-21			5		
		7.0	22-16					
	4D	7.0	12-12					
		9.0	8-4					
						9.5	▼	
	5D	10.0	1/12"					
		12.0	1-1					
	6U	12.0	PUSH=24"			13		
		14.0	REC=22"					
	7D	14.0	2-6			15		
		16.0	4-7					
13:35					S2	20		
	8D	20.0	9-11					
		22.0	13-12					
						25		
	9D	25.0	4-3					
		27.0	6-6					
						30		
	10D	30.0	4-5					
		32.0	7-6			32		
						35		
						40		
						45		
						50		

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-6U
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +9.0±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 10
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER 3" O. D. SHELBY TUBE TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 32 NO. OF 3" SHELBY TUBE SAMPLES 1
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-31-23

CLASSIFICATION CHECK:

-

TYPING CHECK:

PATRICK DONALDSON



BORING NO. MR-7

SHEET 1 OF 2

FILE NO. 14466

SURFACE ELEV.	+14.5±
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RES. ENGR. BENJAMN JAHNKE

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

MRCE Form BL-1

BORING NO. MR-7

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-7
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +14.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 5
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☐ YES ☒ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER TYPE OF DRILLING MUD
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.
*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER MIKE MARTINO **HELPERS** JIMMY MARTINEZ
REMARKS ENCOUNTERED PIPE AT 5.8' WHEN DRIVING SPLIT SPOON. OFFSET HOLE TO BORING MR-7A 2-FT TO THE NORTH. BOREHOLE BACKFILLED WITH HYDRATED BENTONITE PELLETS.
RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 03-28-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON
BORING NO. MR-7



BORING NO.	MR-7A
SHEET 1 OF	3
FILE NO.	14466
RFACE ELEV.	+14.5±
RES. ENGR.	BENJAMN JAHNKE

BORING NO.	MR-7A
SHEET 1 OF	3
FILE NO.	14466
SURFACE ELEV.	+14.5±
RES. ENGR.	BENJAMN JAHNKE

MRCE Form BL-1

BORING NO. MR-7A



BORING NO.	MR-7A
SHEET 2 OF	3
FILE NO.	14466
RFACE ELEV.	+14.5±
RES. ENGR.	BENJAMN JAHNKE

BORING NO.	MR-7A
SHEET 2 OF	3
FILE NO.	14466
SURFACE ELEV.	+14.5±
RES. ENGR.	BENJAMN JAHNKE

MRCE Form BL-1

BORING NO. MR-7A

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-7A
SHEET 3 **OF** 3
FILE NO. 14466
SURFACE ELEV. +14.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 25
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-28-23

CLASSIFICATION CHECK:

-

TYPING CHECK:

PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
 LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-8
 SHEET 1 OF 2
 FILE NO. 14466
 SURFACE ELEV. +12.5±
 RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING	REMARKS
	NO.	DEPTH	BLOWS/6"				BLOWS	
10:00	1D	0.0	1-3	Top 10": Brn f-m sand, sm silt, tr gvl (Fill)(SM)	F		DRILLED	4D Bot: Odor. REC=4"
03-28-23		2.0	8-5	Bot 10": Lt brn f-c sand, sm gvl, tr silt (Fill) (SP-SM)			AHEAD	
Tuesday	2D	2.0	5-9	Light brown, black fine to coarse sand, some			4"	
Rain		4.0	17-24	silt, gravel, trace roots, clay (Fill) (SM)				
45°F	3D	4.0	25-29	Black fine to coarse sand, some gravel, trace		5		
		6.0	27-31	silt, brick (Fill) (SM)				
	4D	6.0	24-16	Top 6": Black, gray f-c sand, sm gravel (Fill)(SP)				
		8.0	6-7	Bot 10": Blk f-c sand, some silt, gravel (Fill) (SM)				
	5D	8.0	5-8	Gray fine to coarse sand, some gravel, trace				
		10.0	11-5	silt (Fill) (SP)		10		
	6NR	10.0	3-4	No recovery	O			
		12.0	6-8					
						13.5		
						15		
	7D	15.0	WH/18"	Gray silt, some fine to medium sand, trace roots				
		17.0	1	(ML)				
						20	↓	
	8D	20.0	WH/24"	Gray silt, some fine to medium sand, trace clay				
		22.0		(ML)	S2			End of Boring at 32'.
						23.5		
						25		
	9D	25.0	3-3	Gray silty fine to medium sand (SM)				
		27.0	3-4					
						30		
	10D	30.0	5-3	Gray fine to coarse sand, some silt, gravel				
11:30		32.0	4-4	(SM)		32		
						35		
						40		
						45		
						50		

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-8
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +12.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 20
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☐ YES ☒ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. 32 NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER MIKE TARTER **HELPERS** JIMMY MARTINEZ
REMARKS BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 03-28-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-9
SHEET 1 OF 2
FILE NO. 14466
SURFACE ELEV. +7.5±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
11:15	1D	0.0	1-4	Top 8": Brn f-m sand, sm silt, roots (Fill) (SM)	F		DRILLED	2D Top: Geotextile in sample.
03-30-23		2.0	7-6	Bot 8": Gray, white fine to coarse sand, some gravel, silt, trace roots (Fill) (SM)			AHEAD	
Thursday							4"	
Sunny	2D	2.0	5-13	Top 8": Gray white fine to coarse sand, some gravel, silt, trace mica (Fill) (SM)		4.5		
35°F		4.0	18-9	Bot 6": Dk gray silty f-c sand, tr gravel, brk (SM)	S1			Odor. Odor. Fast drilling from 13' to 14'. Some sand in tube. Odor, visible sheen.
	3D	5.0	6-6	Black silty fine to coarse sand, some gravel (SM)				
		7.0	7-8					
	4D	7.0	11-5	Black silty fine to coarse sand, trace gravel, roots (SM)		10		
		9.0	3-2					
	5NR	10.0	6-4	No recovery				
		12.0	5-7					
	6UNR	14.0	PUSH=24"	No recovery		14		
		16.0	REC=0"			15		
	6D	16.0	1-5	Gray fine to coarse sand (SP)	S2			Oil stains throughout; odor. End of Boring at 32'.
		18.0	8-9					
	7D	20.0	5-5	Gray fine to coarse sand, trace silt (SP)		20	▼	
		22.0	5-6					
	8D	25.0	3-4	Do 7D (SP)		25		
		27.0	3-4					
						30		
	9D	30.0	3-4	Gray fine to coarse sand (SP)				
13:15		32.0	5-6			32		
						35		
						40		
						45		
						50		

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-9
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +7.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 20
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-30-23

CLASSIFICATION CHECK:

-

TYPING CHECK:

PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-10U
SHEET 1 OF 2
FILE NO. 14466
SURFACE ELEV. +10.0±
RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
08:00 03-30-23 Thursday Sunny 30°F	1D	0.0	1-5	Top 7": Brown f-m sand, sm silt, roots (Fill) (SM)	F		DRILLED	
		2.0	10-8	Bot 10": Gray, black fine to coarse sand, some gravel, silt, trace mica (Fill) (SM)			AHEAD	
							4"	
	2D	2.0	7-9	Dark brown fine to coarse sand, some silt, trace gravel (Fill) (SM)	S1	4.5		
		4.0	15-20	Black silty fine to coarse sand, trace gravel (SM)				
	3D	5.0	26-24					
		7.0	26-17		O	9.5		
	4D	7.0	26-17	Do 3D (SM)				
		9.0	19-9					
	5D	10.0	WH/24"	Black clay, some silt, roots (OL)	S2	13		
		12.0						
	6U	12.0	PUSH=24"	Top: Dark gray si fine sand, sm gvl, tr cl (OL&SM)				
		14.0	REC=24"	Bot: Gray f-m sand, trace silt (SP-SM)		15		
	7D	14.0	1-3	Gray fine to coarse sand, some gravel, trace silt (SP-SM)				
		16.0	10-11					
						20	▼	
	8D	20.0	11-16	Gray fine to coarse sand (SP)				
		22.0	16-19					
						25		
	9D	25.0	7-7	Gray fine to coarse sand, trace gravel (SP)				
		27.0	7-7					
10:00						30		Remnant oil at very top of split spoon.
	10D	30.0	3-3	Gray fine to coarse sand, trace silt (SP-SM)				
		32.0	4-5			32		
						35		
						40		
						45		
						50		

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-10U
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +10.0±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 20
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER 3" O. D. SHELBY TUBE TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES 1
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-31-23

CLASSIFICATION CHECK:

-

TYPING CHECK:

PATRICK DONALDSON

BORING LOG

PROJECT: 2731 12TH STREET
 LOCATION: BROOKLYN, NEW YORK

BORING NO. MR-11U
 SHEET 1 OF 2
 FILE NO. 14466
 SURFACE ELEV. +10.5±
 RES. ENGR. BENJAMN JAHNKE

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
07:50 03-31-23 Friday Sunny 40°F	1D	0.0	3-6	Gray fine to coarse sand, some gravel, trace mica (Fill) (SP-SM)	F		DRILLED	Topsoil from 0' to 0.3'.
		2.0	7-5				AHEAD	
	2D	2.0	6-9	Gray fine to coarse sand, some gravel, black fine to medium sand, trace silt (Fill) (SP-SM)			4"	Sample 2D contained geotextile fabric.
		4.0	14-16					
	3D	5.0	36-25	Top 5":Gray, wht f-c sa, sm gvl, tr silt(Fill)(SP-SM) Bot 8": Blk, gray f-c sand, sm gvl, si, tr roots (SM)	S1	5		
		7.0	7-4			5.4		
	4D	7.0	3-3	Black silty fine to coarse sand, some gravel, trace clay, roots (SM)				
		9.0	2-2					
						9.5		
	5U	10.0	PUSH=24" REC=10"	Top: Gray silty gravel, trace fine sand (GP) Bot: Black peat, trace fine sand, gravel (Pt) No recovery	O			Gravel on top of tube.
		12.0						
	6NR	12.0	WH-1					
		14.0	1-1					
					14.5	▼		
	7D	15.0	1/12"	Gray silty fine to coarse sand, trace roots, gravel (SM)	S2			
		17.0	2-9					
						20		
	8D	20.0	7-8	Gray fine to coarse sand, trace silt (SP-SM)				
		22.0	9-10					
						25		
	9D	25.0	3-3	Do 8D (SP-SM)				
		27.0	6-6					
					30			
	10D	30.0	3-5	Do 8D (SP-SM)				
09:15		32.0	7-6			32	End of Boring at 32'.	
					40			
		</						

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-11U
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +10.5±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 15
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER 3" O. D. SHELBY TUBE TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES 1
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-31-23

CLASSIFICATION CHECK:

-

TYPING CHECK:

PATRICK DONALDSON



BORING NO. MR-12

SHEET 1 OF 2

FILE NO. 14466

SURFACE ELEV. +10.0±

RES. ENGR. BENJAMN JAHNKE

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

MRCE Form BL-1

BORING NO. MR-12

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-12
SHEET 2 **OF** 2
FILE NO. 14466
SURFACE ELEV. +10.0±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING** **CASING USED** ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 5
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO
D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.
*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO **SKETCH SHOWN ON**

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR CRAIG GEOTECHNICAL DRILLING CO., INC.
DRILLER MIKE TARTER **HELPERS** JIMMY MARTINEZ
REMARKS HARD DRILLING & SPLIT SPOON REFUSAL AT 5'. BOREHOLE BACKFILLED WITH HYDRATED BENTONITE PELLETS.

RESIDENT ENGINEER BENJAMIN JAHNKE **DATE** 03-29-23
CLASSIFICATION CHECK: - **TYPING CHECK:** PATRICK DONALDSON



BORING NO. MR-12A

SHEET 1 OF 3

FILE NO. 14466

SURFACE ELEV. +10.0±

RES. ENGR. BENJAMN JAHNKE

PROJECT: 2731 12TH STREET
LOCATION: BROOKLYN, NEW YORK

MRCE Form BL-1

BORING NO. MR-12A



BORING NO.	MR-12A
SHEET 2 OF	3
FILE NO.	14466
RFACE ELEV.	+10.0±
RES. ENGR.	BENJAMN JAHNKE

BORING NO.	MR-12A
SHEET 2 OF	3
FILE NO.	14466
SURFACE ELEV.	+10.0±
RES. ENGR.	BENJAMN JAHNKE

BORING NO. MR-12A

PROJECT 2731 12TH STREET
LOCATION BROOKLYN, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING NO. MR-12A
SHEET 3 **OF** 3
FILE NO. 14466
SURFACE ELEV. +10.0±
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG **TYPE OF FEED**
MAKE AND MODEL **DURING CORING**

CASING USED ☒ YES ☐ NO

TRUCK MECHANICAL DIA., IN. 4 DEPTH, FT. FROM 0 TO 15
SKID CME-55 HYDRAULIC DIA., IN. DEPTH, FT. FROM TO
BARGE OTHER DIA., IN. DEPTH, FT. FROM TO
OTHER

TYPE AND SIZE OF **DRILLING MUD USED** ☒ YES ☐ NO

D-SAMPLER 2" O. D. SPLIT SPOON DIAMETER OF ROTARY BIT, IN. 3-7/8
U-SAMPLER TYPE OF DRILLING MUD QUIK GEL
S-SAMPLER
CORE BARREL
CORE BIT
DRILL RODS NWJ

AUGER USED ☐ YES ☒ NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC
*HAMMER RATE, BLOWS PER MINUTE (BPM):

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED

☐ YES

☒ NO

SKETCH SHOWN ON

STANDPIPE: TYPE ID, IN. LENGTH, FT. TOP ELEV.
INTAKE ELEMENT: TYPE OD, IN. LENGTH, FT. TIP ELEV.
FILTER: MATERIAL OD, IN. LENGTH, FT. BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING LIN. FT. NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING LIN. FT. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK LIN. FT. OTHER:

BORING CONTRACTOR

CRAIG GEOTECHNICAL DRILLING CO., INC.

DRILLER

MIKE TARTER

HELPERS

JIMMY MARTINEZ

REMARKS

BOREHOLE TREMIE GROUTED WITH PORTLAND CEMENT & QUIK GEL MIX. CUTTINGS & TUB WATER
DISPOSED IN DRUMS. WASHED TUB & RODS WITH ALCONOX. TOP 5' OF HOLE FILLED WITH HYDRATED
BENTONITE PELLETS.

RESIDENT ENGINEER

BENJAMIN JAHNKE

DATE

03-29-23

CLASSIFICATION CHECK:

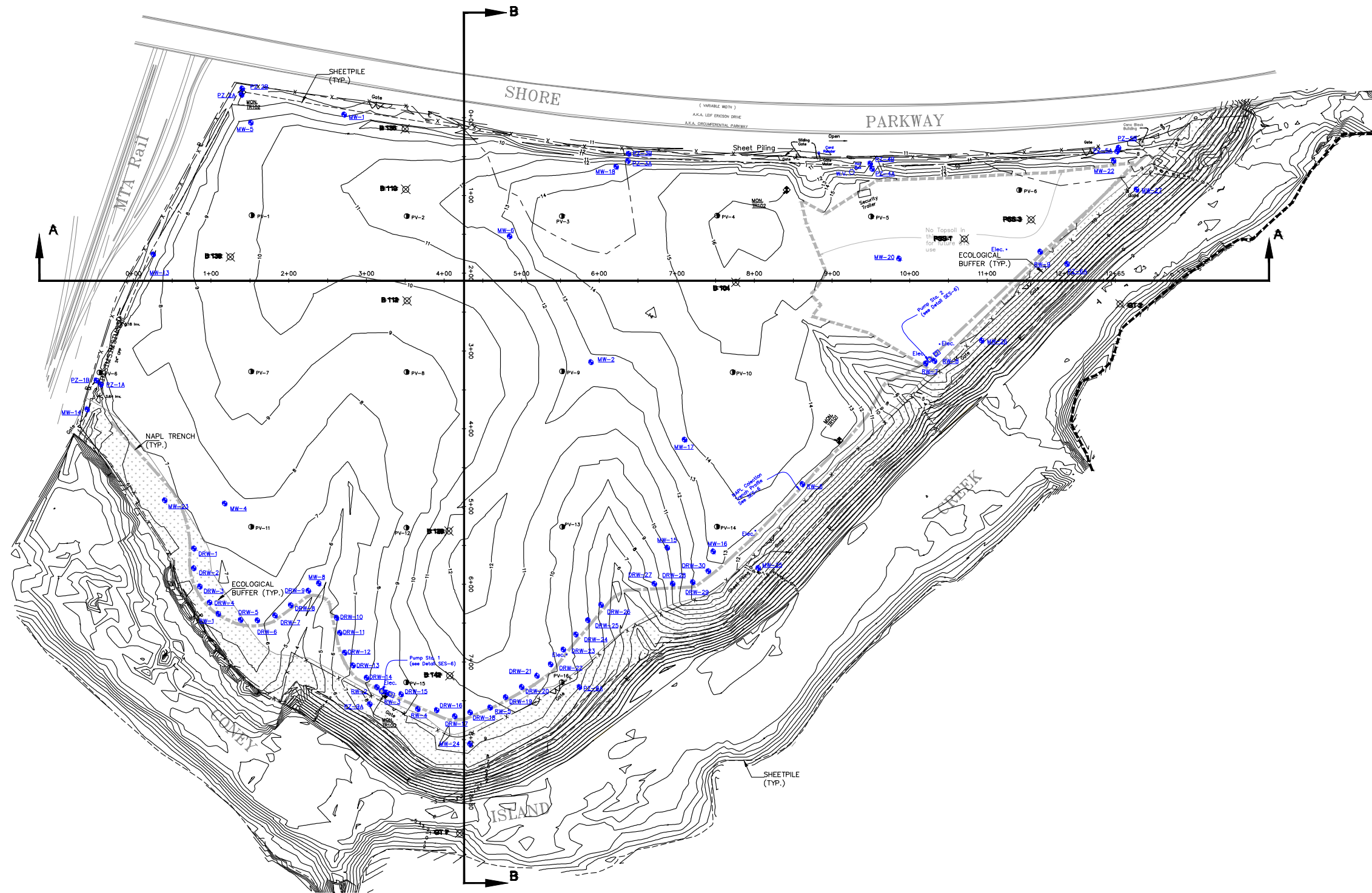
-

TYPING CHECK:

PATRICK DONALDSON

APPENDIX B

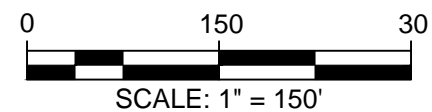
HISTORIC BORING INFORMATION



LEGEND:

- CHAIN-LINK FENCE
- SHEETPILE WALL
- PROPERTY LINE
- NAPL TRENCH ALIGNMENT
- ECOLOGICAL BUFFER ZONE
- BORING LOG
- RW RECOVERY WELL
- DRW DEEP RECOVERY WELL
- MW MONITORING WELL
- CONTROL MONUMENT
- PUMP STATION
- VALVE BOX

SOURCE:
SHEET 2A: CROSS SECTION PLAN, NATIONAL GRID US,
FORMER BROOKLYN BOROUGH GAS WORKS, CONEY ISLAND,
NY, PREPARED BY PS&S, DATED: 11-25-2008.



Site Management Plan
Former Brooklyn Borough (Coney Island) Gas Works Site
Borough of Brooklyn, Kings County, New York

nationalgrid

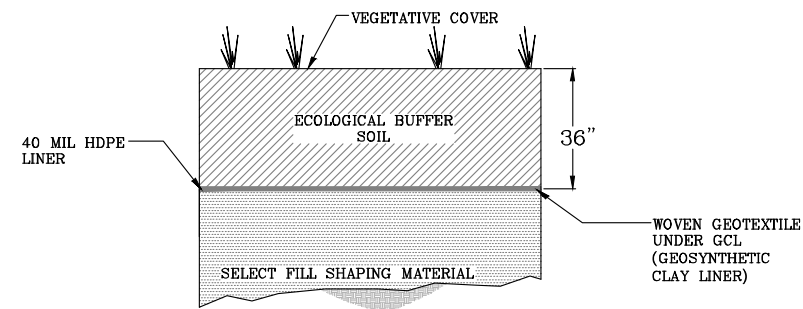


Project 1702897

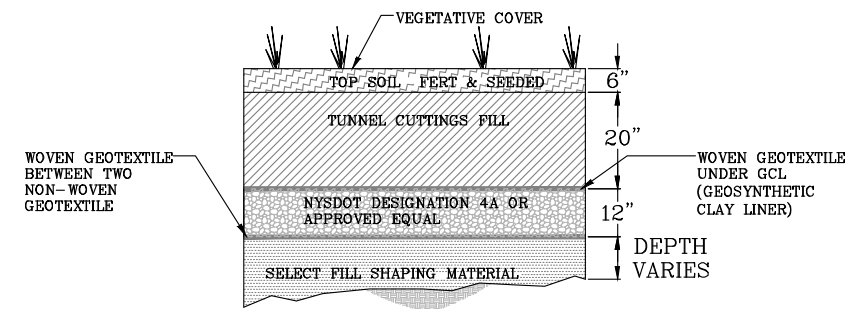
CROSS SECTION PLAN

June 2019

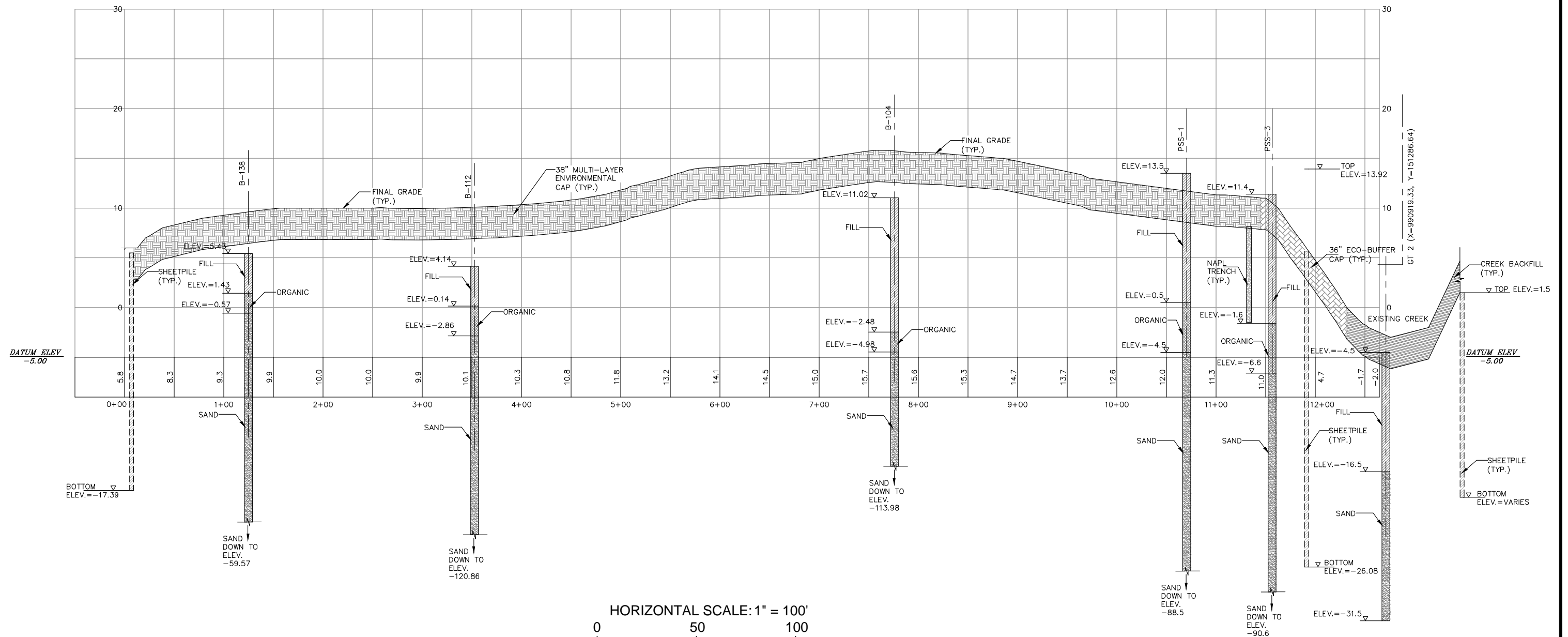
Fig. 3



ECOLOGICAL BUFFER CAP DETAIL
NOT TO SCALE



ENVIRONMENTAL SOIL CAP DETAIL
NOT TO SCALE



HORIZONTAL SCALE: 1" = 100'

0 50 100

0 5 10

VERTICAL SCALE: 1" = 10'

NOTE: 10X VERTICAL EXAGGERATION

SOURCE:
SHEET 2B: CROSS SECTION A-A, NATIONAL GRID US, FORMER
BROOKLYN BOROUGH GAS WORKS, CONEY ISLAND, NY,
PREPARED BY PS&S, DATED: 11-25-2008.

Site Management Plan
Former Brooklyn Borough (Coney Island) Gas Works Site
Borough of Brooklyn, Kings County, New York

nationalgrid

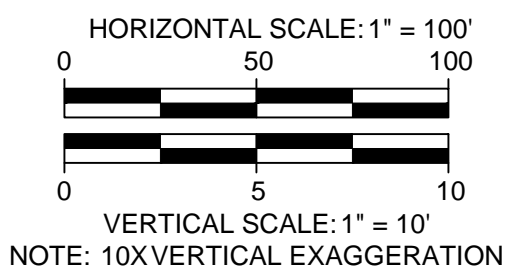
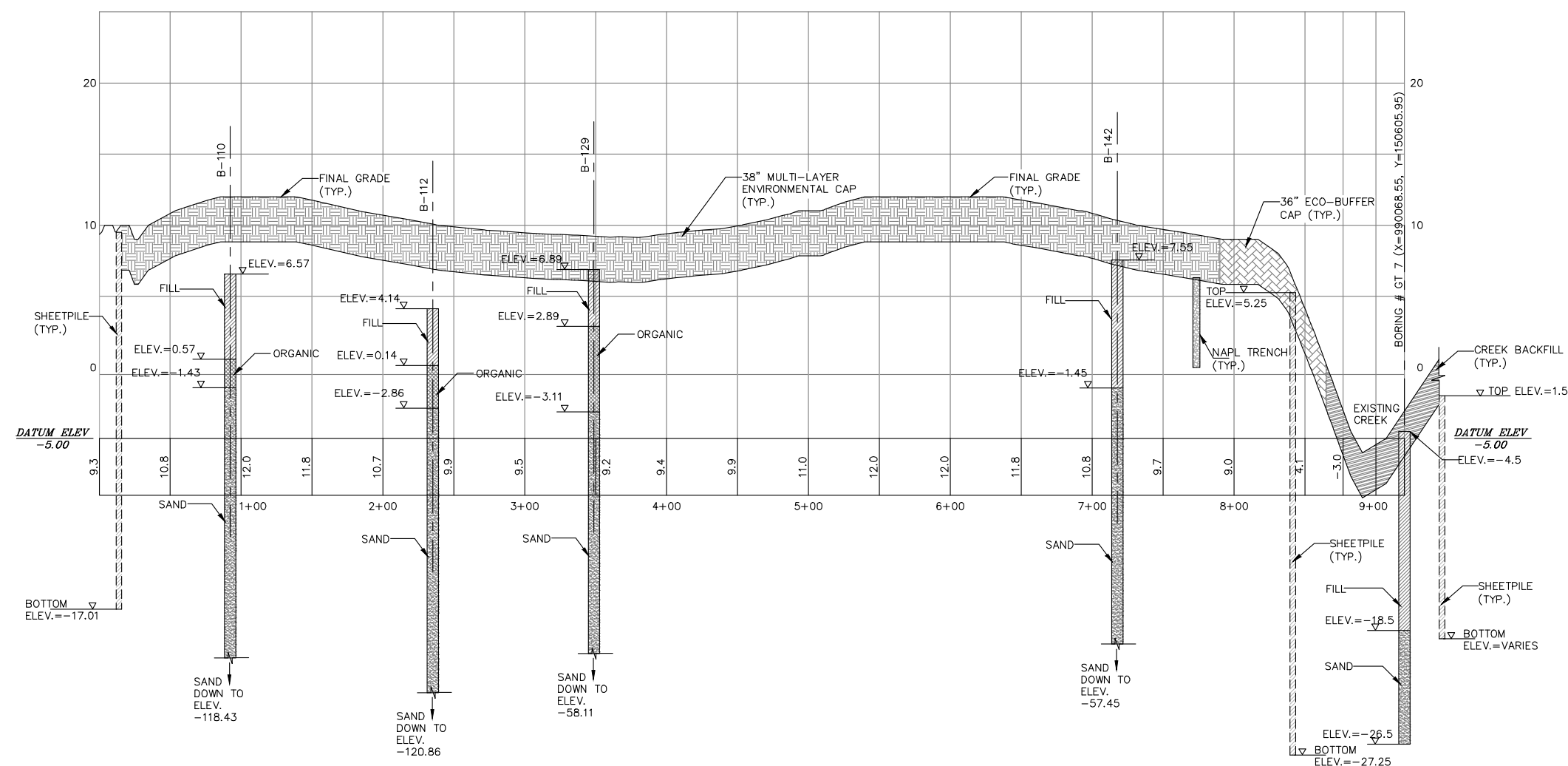


Project 1702897

GEOLOGIC CROSS SECTION
A-A'

June 2019

Fig. 4



SOURCE:
SHEET 2C: CROSS SECTION B-B, NATIONAL GRID US, FORMER
BROOKLYN BOROUGH GAS WORKS, CONEY ISLAND, NY,
PREPARED BY PS&S, DATED: 11-25-2008.

Site Management Plan
Former Brooklyn Borough (Coney Island) Gas Works Site
Borough of Brooklyn, Kings County, New York



GEOLOGIC CROSS-SECTION
B-B'

Project 1702897

June 2019

Fig. 5

APPENDIX C

AVAILABLE GROUNDWATER INFORMATION

Table 2. Groundwater Elevations
Former Brooklyn Borough Gas Works Site
Brooklyn, New York

		February 13-14, 2012		August 14, 2012		April 9, 2013		August 20, 2013		January 28, 2014		July 29-30, 2014		January 20, 2015	
Well ID	Measuring Point Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)
Piezometers															
PZ-1A	8.26	7.57	0.69	7.33	0.93	7.08	1.18	7.08	1.18	6.55	1.71	7.36	0.9	6.85	1.41
PZ-1B	8.28	7.73	0.55	7.39	0.89	7.15	1.13	6.95	1.33	6.34	1.94	7.24	1.04	6.81	1.47
PZ-2A	10.09	8.88	1.21	9.16	0.93	8.88	1.21	9.02	1.07	9	1.09	8.97	1.12	8.56	1.53
PZ-2B	10.89	8.12	2.77	8.21	2.68	7.74	3.15	7.88	3.01	6.74	4.15	7.82	3.07	6.58	4.31
PZ-3A	14.15	11.27	2.88	12.24	1.91	11.41	2.74	12	2.15	12.24	1.91	12.09	2.06	10.22	3.93
PZ-3B	12.28	9.09	3.19	9.34	2.94	9.92	2.36	10.11	2.17	9.07	3.21	9.93	2.35	8.87	3.41
PZ-4A	13.77	12	1.77	11.99	1.78	11.23	2.54	11.71	2.06	10.26	3.51	11.05	2.72	10.97	2.8
PZ-4B	13.83	9.85	3.98	12.04	1.79	11.27	2.56	10.43	3.4	9.96	3.87	10.3	3.53	9.51	4.32
PZ-5A	11.21	9.85	1.36	9.86	1.35	10.09	1.12	9.95	1.26	9.8	1.41	9.9	1.31	9.15	2.06
PZ-5B	11.25	9.81	1.44	9.73	1.52	9.26	1.99	9.85	1.4	10.11	1.14	9.65	1.6	8.95	2.3
PZ-6A	9.72	9.29	0.43	9.08	0.64	8.95	0.77	8.85	0.87	9.4	0.32	9.05	0.67	8.8	0.92
PZ-8A	10.56	9.59	0.97	9.81	0.75	9.28	1.28	9.32	1.24	9.81	0.75	9.45	1.11	8.76	1.8
PZ-9A	10.2	9.66	0.54	9.66	0.54	9.33	0.87	9.3	0.9	10.05	0.15	9.4	0.8	9.16	1.04
Monitoring Wells															
MW-1	11.42	8.39	3.03	9	2.42	8.22	3.2	8.89	2.53	7.94	3.48	8.73	2.69	7.46	3.96
MW-2	14.14	10.98	3.16	11.59	2.55	11.17	2.97	11.49	2.65	11.5	2.64	11.4	2.74	10.57	3.57
MW-4	10.27	9.48	0.79	9.46	0.81	9.19	1.08	9.13	1.14	8.5	1.77	9.27	1	8.84	1.43
MW-5	12.31	9.19	3.12	9.8	2.51	9.1	3.21	9.76	2.55	8.6	3.71	9.54	2.77	8.5	3.81
MW-6	14.12	10.97	3.15	11.65	2.47	11.14	2.98	11.55	2.57	10.59	3.53	11.42	2.7	10.58	3.54
MW-8	7.69	7	0.69	7.01	0.68	6.66	1.03	6.62	1.07	6.22	1.47	6.87	0.82	6.45	1.24
MW-13	9.39	8.53	0.86	8.3	1.09	8.15	1.24	8.18	1.21	7.61	1.78	8.38	1.01	8	1.39
MW-14	7.3	6.91	0.39	6.67	0.63	6.04	1.26	5.77	1.53	5.67	1.63	6.23	1.07	5.76	1.54
MW-15	12.95	11.33	1.62	11.65	1.3	11.18	1.77	11.56	1.39	11.45	1.5	11.6	1.35	10.32	2.63
MW-16	16.14	14.14	2	14.58	1.56	13.81	2.33	14.35	1.79	13.81	2.33	14.5	1.64	13.2	2.94
MW-17	16.57	14.25	2.32	14.79	1.78	14.21	2.36	14.76	1.81	14.45	2.12	14.7	1.87	13.87	2.7
MW-18	15.1	12.13	2.97	12.83	2.27	12.25	2.85	12.68	2.42	11.61	3.49	12.62	2.48	10.76	4.34
MW-20	17.06	14.97	2.09	15.3	1.76	14.64	2.42	15.03	2.03	13.72	3.34	15.25	1.81	14.18	2.88
MW-22	12.27	10.4	1.87	10.78	1.49	10.1	2.17	10.55	1.72	10.12	2.15	10.7	1.57	9.12	3.15
MW-23	8.79	8.18	0.61	7.97	0.82	7.7	1.09	7.65	1.14	7.2	1.59	7.91	0.88	7.52	1.27
MW-24	11.63	11.15	0.48	11.18	0.45	10.89	0.74	10.75	0.88	11.65	-0.02	10.9	0.73	9.8	1.83
MW-25	11.34	9.68	1.66	9.94	1.4	9.36	1.98	9.8	1.54	9.5	1.84	7.28	4.06	9.32	2.02
MW-26	11.04	10.31	0.73	10.34	0.7	9.91	1.13	9.95	1.09	10.45	0.59	10.14	0.9	9.87	1.17
MW-27	11.29	9.04	2.25	10.18	1.11	9.49	1.8	9.88	1.41	9.47	1.82	9.89	1.4	8.77	2.52
MW-28	7.77	7.58	0.19	7.72	0.05	7.09	0.68	6.82	0.95	8.41	-0.64	7.75	0.02	7.1	0.67
MW-29	7.89	7.63	0.26	7.49	0.4	6.97	0.92	7.07	0.82	7.9	-0.01	9.9	-2.01	7.05	0.84
MW-30	8.25	7.78	0.47	7.72	0.53	7.51	0.74	7.3	0.95	8	0.25	7.55	0.7	7.37	0.88
MW-31	7.94	7.42	0.52	7.32	0.62	7.23	0.71	7.05	0.89	7.64	0.3	8.45	-0.51	7.1	0.84

Notes:

bmp - Below Measuring Point

NAVD - North American Vertical Datum

Table 2. Groundwater Elevations
Former Brooklyn Borough Gas Works Site
Brooklyn, New York

		August 20, 2015		January 19, 2016		September 21, 2016		February 17, 2017		30-August 30, 2017 - September 1, 2017	
Well ID	Measuring Point Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)	Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)
Piezometers											
PZ-1A	8.26	7.5	0.76	7.23	1.03	7.41	0.85	7.21	1.05	7.19	1.07
PZ-1B	8.28	7.56	0.72	7.38	0.9	7.42	0.86	7.31	0.97	7.1	1.18
PZ-2A	10.09	9.05	1.04	8.82	1.27	9.04	1.05	8.66	1.43	8.67	1.42
PZ-2B	10.89	8.31	2.58	7.54	3.35	8.7	2.19	7.16	3.73	8.19	2.7
PZ-3A	14.15	12.74	1.41	11.58	2.57	12.32	1.83	9.6	4.55	12.05	2.1
PZ-3B	12.28	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PZ-4A	13.77	12.27	1.5	10.83	2.94	12.28	1.49	10.68	3.09	11.67	2.1
PZ-4B	13.83	10.52	3.31	10.23	3.6	9.75	4.08	9.18	4.65	9.74	4.09
PZ-5A	11.21	9.94	1.27	9.32	1.89	9.82	1.39	9.3	1.91	9.77	1.44
PZ-5B	11.25	9.3	1.95	9.35	1.9	9.12	2.13	9.42	1.83	8.91	2.34
PZ-6A	9.72	8.82	0.9	9.19	0.53	8.71	1.01	8.97	0.75	8.59	1.13
PZ-8A	10.56	9.65	0.91	8.2	2.36	8.26	2.3	8.41	2.15	9.11	1.45
PZ-9A	10.2	9.4	0.8	9.81	0.39	9.49	0.71	9.47	0.73	9.27	0.93
Monitoring Wells											
MW-1	11.42	9.23	2.19	8.32	3.1	9.39	2.03	7.43	3.99	8.81	2.61
MW-2	14.14	11.94	2.2	11.18	2.96	12	2.14	10.52	3.62	7.9	6.24
MW-4	10.27	9.47	0.8	9.12	1.15	9.24	1.03	9	1.27	9.03	1.24
MW-5	12.31	10.08	2.23	9.21	3.1	10.2	2.11	8.31	4	9.75	2.56
MW-6	14.12	12.07	2.05	11.27	2.85	12.21	1.91	10.55	3.57	11.53	2.59
MW-8	7.69	7.02	0.67	6.9	0.79	6.95	0.74	6.83	0.86	6.69	1
MW-13	9.39	8.42	0.97	8.15	1.24	8.33	1.06	8.16	1.23	8.01	1.38
MW-14	7.3	6.67	0.63	6.62	0.68	6.52	0.78	6.49	0.81	6.21	1.09
MW-15	12.95	11.82	1.13	10.34	2.61	11.22	1.73	10	2.95	11.2	1.75
MW-16	16.14	14.88	1.26	13.38	2.76	13.7	2.44	13.86	2.28	14.49	1.65
MW-17	16.57	15.1	1.47	14.78	1.79	15.11	1.46	14.8	1.77	14.73	1.84
MW-18	15.1	13.21	1.89	12.18	2.92	13.29	1.81	11.4	3.7	12.77	2.33
MW-20	17.06	15.57	1.49	14.19	2.87	15.56	1.5	13.98	3.08	15.25	1.81
MW-22	12.27	10.84	1.43	9.79	2.48	10.84	1.43	9.21	3.06	10.73	1.54
MW-23	8.79	8.07	0.72	7.95	0.84	7.8	0.99	7.97	0.82	7.71	1.08
MW-24	11.63	10.75	0.88	11.55	0.08	7.25	4.38	11.12	0.51	10.81	0.82
MW-25	11.34	10.18	1.16	9.25	2.09	8.04	3.3	9.13	2.21	9.76	1.58
MW-26	11.04	10.27	0.77	10.18	0.86	7.95	3.09	9.91	1.13	9.81	1.23
MW-27	11.29	9.98	1.31	8.84	2.45	9.96	1.33	8.6	2.69	9.77	1.52
MW-28	7.77	6.55	1.22	8.45	-0.68	6.37	1.4	7.35	0.42	5.81	1.96
MW-29	7.89	7.06	0.83	7.79	0.1	6.99	0.9	7.4	0.49	6.81	1.08
MW-30	8.25	7.73	0.52	7.83	0.42	7.14	1.11	7.6	0.65	6.61	1.64
MW-31	7.94	7.3	0.64	7.28	0.66	7.02	0.92	7.21	0.73	6.84	1.1

Notes:

bmp - Below Measuring

NAVD - North American



<p>SOURCE:</p> <ol style="list-style-type: none"> 1. AERIAL IMAGERY DATE: 05/29/2016, OBTAINED FROM WORLD IMAGERY LAYER ACCESSED VIA ARCGIS ONLINE. 2. GROUNDWATER CONTOURS FROM PERIODIC REVIEW REPORT FIGURE 4: GROUNDWATER CONTOUR MAP FOR SEPTEMBER 21, 2016, PREPARED BY ARCADIS, DATED 11/29/2016. 	<p>0 120 240</p> <p>SCALE: 1" = 120'</p>	<p>Site Management Plan Former Brooklyn Borough (Coney Island) Gas Works Site Borough of Brooklyn, Kings County, New York</p>		<p>GEI Consultants</p>	<p>GROUNDWATER CONTOUR MAP AUGUST 30 & SEPTEMBER 30 2017</p>
		<p>nationalgrid</p>			

Table 3. Groundwater Level Measurements
Periodic Review Report
Former Brooklyn Borough (Coney Island) Gas Works Site
Coney Island, New York

Well ID	Measuring Point Elevation (feet NAVD88)	August 8-9, 2022	
		Depth to Groundwater (feet bmp)	Groundwater Elevation (feet NAVD88)
Piezometers			
PZ-1A	8.26	WA	WA
PZ-1B	8.28	WA	WA
PZ-2A	10.09	WA	WA
PZ-2B	10.89	NM	NC*
PZ-3A	14.15	12.59	1.56
PZ-3B	12.28	NM	NC
PZ-4A	13.77	11.86	1.91
PZ-4B	13.83	10.53	3.30
PZ-5A	11.21	10.24	0.97
PZ-5B	11.25	10.09	1.16
PZ-6A	9.72	7.11	2.61
PZ-8A	10.56	9.64	0.92
PZ-9A	10.20	9.89	0.31
Monitoring Wells			
MW-1	11.42	NM	NC*
MW-2	14.14	7.41	6.73
MW-4	10.27	NM	WA
MW-5	12.31	6.30	NC*
MW-6	14.12	11.05	3.07
MW-8	7.69	7.13	0.56
MW-13	9.39	NM	NC
MW-14	7.30	NM	NC
MW-15	12.95	WA	WA
MW-16	16.14	WA	WA
MW-17	16.57	WA	WA
MW-18	15.10	WA	WA
MW-20	17.06	11.24	5.82
MW-22	12.27	10.70	1.57
MW-23	8.79	8.14	0.65
MW-24	11.63	WA	WA
MW-25	11.34	WA	WA
MW-26	11.04	WA	WA
MW-27	11.29	WA	WA
MW-28	7.77	NM	NC
MW-29	7.89	7.72	0.17
MW-30	8.25	7.91	0.34
MW-31	7.94	7.50	0.44

Notes:

Horizontal reference datum is the North American Datum of 1983 (NAD83), New York State Plane Long Island Zone (FIPS 3104).

Vertical reference datum is the North American Vertical Datum of 1988 (NAVD88).

bmp=below measuring point

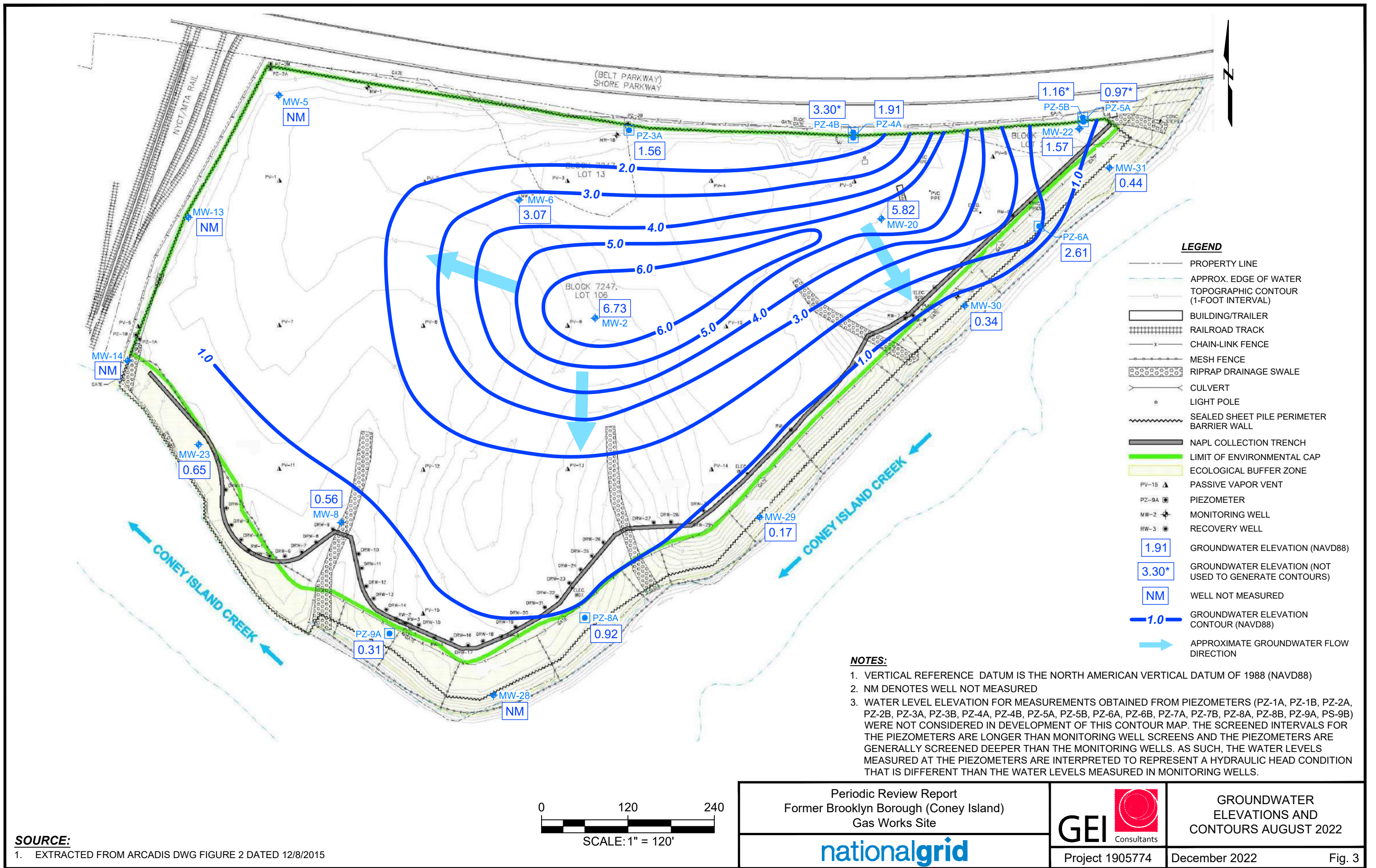
bgs=below ground surface

NM=not measured

NC=not calculated

WA=well abandoned or replaced.

*: New well or survey point altered. To be resurveyed.



APPENDIX F

NYS DEC Details and Specifications

STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK



that 8" diameter socks may be used for residential lots to control areas less than 0.25 acres.

- The flat dimension of the sock shall be at least 1.5 times the nominal diameter.
- The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	5	10	20	25	33	50
8	225*	200	100	50	20	—	—
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50

* Length in feet

Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

- Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.
- Diameters designed for use shall be 12" – 32" except



- The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**
- The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2" x 2" wooden stakes driven 12" into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.
8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.
3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.
4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.
5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

Maintenance

1. Traffic shall not be permitted to cross filter socks.
2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

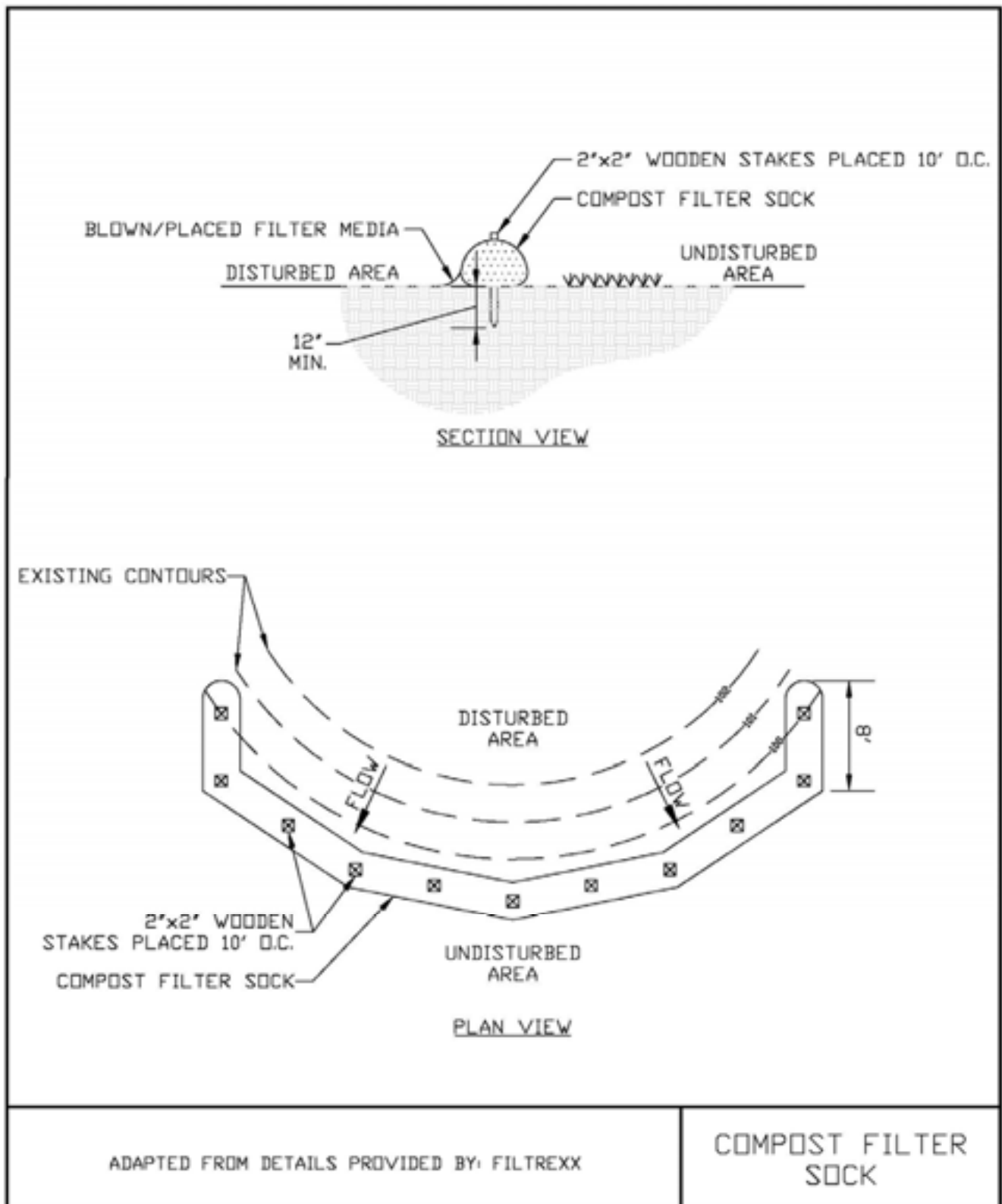
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Table 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1" screen and 10 - 50% passing a 3/8" screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR CONCRETE TRUCK WASHOUT



Definition & Scope

A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil.

Conditions Where Practice Applies

Washout facilities shall be provided for every project where concrete will be poured or otherwise formed on the site. This facility will receive highly alkaline wash water from the cleaning of chutes, mixers, hoppers, vibrators, placing equipment, trowels, and screeds. Under no circumstances will wash water from these operations be allowed to infiltrate into the soil or enter surface waters.

Design Criteria

Capacity: The washout facility should be sized to contain solids, wash water, and rainfall and sized to allow for the evaporation of the wash water and rainfall. Wash water shall be estimated at 7 gallons per chute and 50 gallons per hopper of the concrete pump truck and/or discharging drum. The minimum size shall be 8 feet by 8 feet at the bottom and 2 feet deep. If excavated, the side slopes shall be 2 horizontal to 1 vertical.

Location: Locate the facility a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams and other surface waters. Prevent surface water from entering the structure except for the access road. Provide appropriate access with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.

Liner: All washout facilities will be lined to prevent

leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

If pre-fabricated washouts are used they must ensure the capture and containment of the concrete wash and be sized based on the expected frequency of concrete pours. They shall be sited as noted in the location criteria.

Maintenance

- All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately. Excess rainwater that has accumulated over hardened concrete should be pumped to a stabilized area, such as a grass filter strip.
- Accumulated hardened material shall be removed when 75% of the storage capacity of the structure is filled. Any excess wash water shall be pumped into a containment vessel and properly disposed of off site.
- Dispose of the hardened material off-site in a construction/demolition landfill. On-site disposal may be allowed if this has been approved and accepted as part of the projects SWPPP. In that case, the material should be recycled as specified, or buried and covered with a minimum of 2 feet of clean compacted earthfill that is permanently stabilized to prevent erosion.
- The plastic liner shall be replaced with each cleaning of the washout facility.
- Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

STANDARD AND SPECIFICATIONS FOR DUST CONTROL



dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

Definition & Scope

The control of dust resulting from land-disturbing activities, to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

Construction Specifications

A. Non-driving Areas – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of

B. Driving Areas – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access route to provide short term limited dust control.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geo-textiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR PROTECTING VEGETATION DURING CONSTRUCTION



Definition & Scope

The protection of trees, shrubs, ground cover and other vegetation from damage by construction equipment. In order to preserve existing vegetation determined to be important for soil erosion control, water quality protection, shade, screening, buffers, wildlife habitat, wetland protection, and other values.

Conditions Where Practices Applies

On planned construction sites where valued vegetation exists and needs to be preserved.

Design Criteria

1. Planning Considerations

A. Inventory:

1) Property boundaries, topography, vegetation and soils information should be gathered. Identify potentially high erosion areas, areas with tree windthrow potential, etc. A vegetative cover type map should be made on a copy of a topographic map which shows other natural and manmade features. Vegetation that is desirable to preserve because of its value for screening, shade, critical erosion control, endangered species, aesthetics, etc., should be identified and marked on the map.

2) Based upon this data, general statements should be prepared about the present condition, potential problem areas, and unique features of the property.

B. Planning:

1) After engineering plans (plot maps) are prepared, another field review should take place and

recommendations made for the vegetation to be saved. Minor adjustments in location of roads, dwellings, and utilities may be needed. Construction on steep slopes, erodible soils, wetlands, and streams should be avoided. Clearing limits should be delineated (See "Determine Limits of Clearing and Grading" on page 2.2).

2) Areas to be seeded and planted should be identified. Remaining vegetation should blend with their surroundings and/or provide special function such as a filter strip, buffer zone, or screen.

3) Trees and shrubs of special seasonal interest, such as flowering dogwood, red maple, striped maple, serviceberry, or shadbush, and valuable potential shade trees should be identified and marked for special protective treatment as appropriate.

4) Trees to be cut should be marked on the plans. If timber can be removed for salable products, a forester should be consulted for marketing advice.

5) Trees that may become a hazard to people, personal property, or utilities should be removed. These include trees that are weak-wooded, disease-prone, subject to windthrow, or those that have severely damaged root systems.

6) The vigor of remaining trees may be improved by a selective thinning. A forester should be consulted for implementing this practice.

2. Measures to Protect Vegetation

A. Limit soil placement over existing tree and shrub roots to a maximum of 3 inches. Soils with loamy texture and good structure should be used.

B. Use retaining walls and terraces to protect roots of trees and shrubs when grades are lowered. Lowered grades should start no closer than the dripline of the tree. For narrow-canopied trees and shrubs, the stem diameter in inches is converted to feet and doubled, such that a 10 inch tree should be protected to 20 feet.

C. Trenching across tree root systems should be the same minimum distance from the trunk, as in "B". Tunnels under root systems for underground utilities should start 18 inches or deeper below the normal ground surface. Tree roots which must be severed should be cut clean. Backfill material that will be in contact with the roots should be topsoil or a prepared planting soil mixture.

D. Construct sturdy fences, or barriers, of wood, steel, or other protective material around valuable

vegetation for protection from construction equipment. Place barriers far enough away from trees, but not less than the specifications in "B", so that tall equipment such as backhoes and dump trucks do not contact tree branches.

E. Construction limits should be identified and clearly marked to exclude equipment.

F. Avoid spills of oil/gas and other contaminants.

G. Obstructive and broken branches should be pruned properly. The branch collar on all branches whether living or dead should not be damaged. The 3 or 4 cut method should be used on all branches larger than two inches at the cut. First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

H. Penalties for damage to valuable trees, shrubs, and herbaceous plants should be clearly spelled out in the contract.

PROTECTING TREES IN HEAVY USE AREAS

The compaction of soil over the roots of trees and shrubs by the trampling of recreationists, vehicular traffic, etc., reduces oxygen, water, and nutrient uptake by feeder roots. This weakens and may eventually kill the plants. Table 2.6 rates the "Susceptibility of Tree Species to Compaction."

Where heavy compaction is anticipated, apply and maintain a 3 to 4 inch layer of undecayed wood chips or 2 inches of No. 2 washed, crushed gravel. In addition, use of a wooden or plastic mat may be used to lessen compaction, if applicable.

Table 2.6
Susceptibility of Tree Species to Compaction¹

Resistant:

Box elder.....	<i>Acer negundo</i>	Willows.....	<i>Salix spp.</i>
Green ash.....	<i>Fraxinus pennsylvanica</i>	Honey locust.....	<i>Gleditsia triacanthos</i>
Red elm.....	<i>Ulmus rubra</i>	Eastern cottonwood.....	<i>Populus deltoides</i>
Hawthornes.....	<i>Crataegus spp.</i>	Swamp white oak.....	<i>Quercus bicolor</i>
Bur oak.....	<i>Quercus macrocarpa</i>	Hophornbeam.....	<i>Ostrya virginiana</i>
Northern white cedar....	<i>Thuja occidentalis</i>		

Intermediate:

Red maple.....	<i>Acer rubrum</i>	Sweetgum.....	<i>Liquidambar styraciflua</i>
Silver maple.....	<i>Acer saccharinum</i>	Norway maple.....	<i>Acer platanoides</i>
Hackberry.....	<i>Celtis occidentalis</i>	Shagbark hickory.....	<i>Carya ovata</i>
Black gum.....	<i>Nyssa sylvatica</i>	London plane.....	<i>Platanus x hybrida</i>
Red oak.....	<i>Quercus rubra</i>	Pin oak.....	<i>Quercus palustris</i>
Basswood.....	<i>Tilia americana</i>		

Susceptible:

Sugar maple.....	<i>Acer saccharum</i>	Austrian Pine.....	<i>Pinus nigra</i>
White pine.....	<i>Pinus strobus</i>	White ash.....	<i>Fraxinus americana</i>
Blue spruce.....	<i>Picea pungens</i>	Paper birch.....	<i>Betula papyrifera</i>
White oak.....	<i>Quercus alba</i>	Mountain ash.....	<i>Sorbus aucuparia</i>
Red pine.....	<i>Pinus resinosa</i>	Japanese maple.....	<i>Acer palmatum</i>

¹ If a tree species does not appear on the list, insufficient information is available to rate it for this purpose.

STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and

roll down. The area beyond the fence must be undisturbed or stabilized.

3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.

Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.

Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

Super Silt Fence

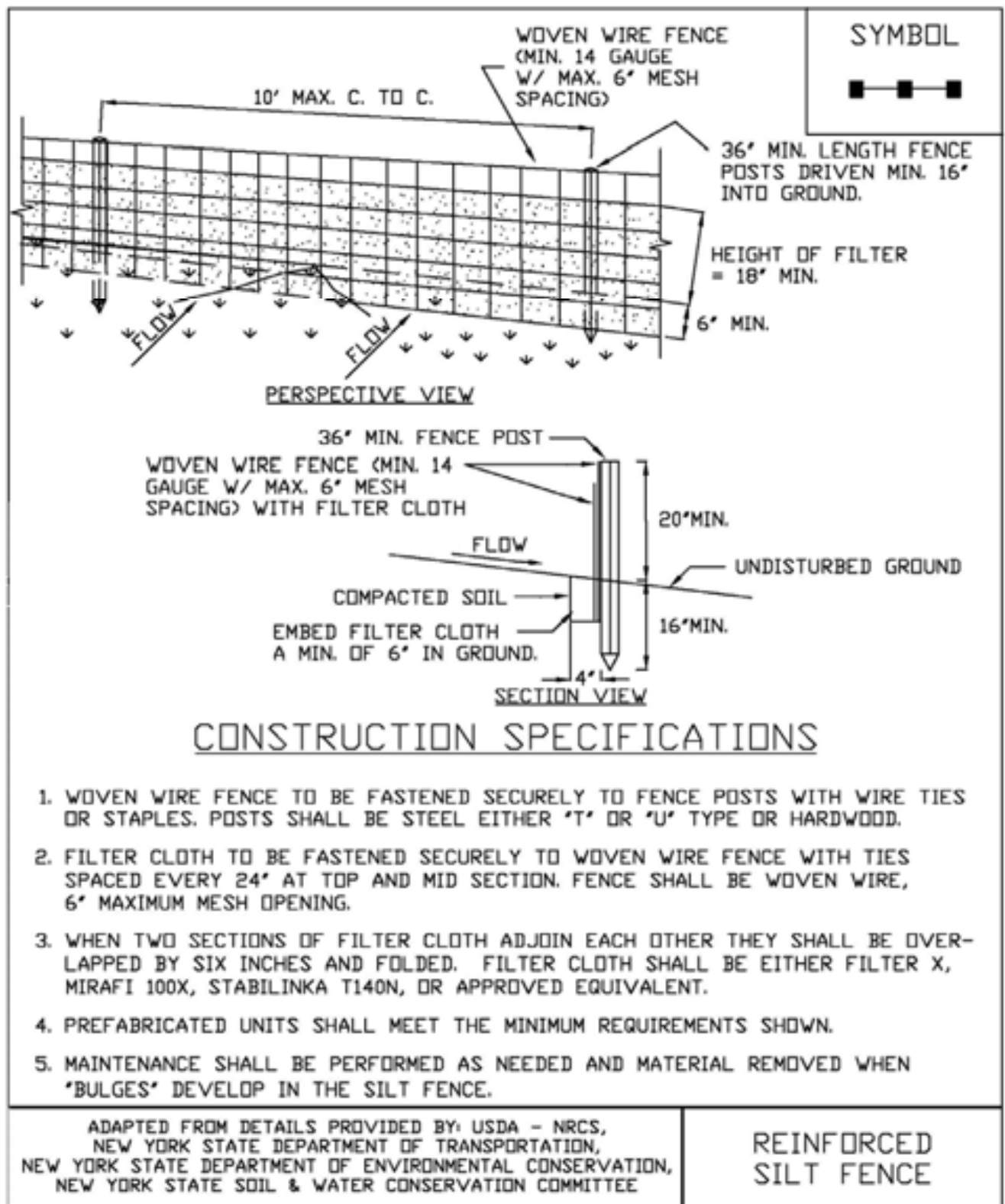


2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.
4. Prefabricated silt fence is acceptable as long as all material specifications are met.

Reinforced Silt Fence



Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR SITE POLLUTION PREVENTION



Definition & Scope

A collection of management practices intended to control non-sediment pollutants associated with construction activities to prevent the generation of pollutants due to improper handling, storage, and spills and prevent the movement of toxic substances from the site into surface waters.

Conditions Where Practice Applies

On all construction sites where the earth disturbance exceeds 5,000 square feet, and involves the use of fertilizers, pesticides, petroleum based chemicals, fuels and lubricants, as well as sealers, paints, cleared woody vegetation, garbage, and sanitary wastes.

Design Criteria

The variety of pollutants on a particular site and the severity of their impacts depend on factors such as the nature of the construction activity, the physical characteristics of the construction site, and the proximity of water bodies and conveyances to the pollutant source.

1. All state and federal regulations shall be followed for the storage, handling, application, usage, and disposal of pesticides, fertilizers, and petroleum products.
2. Vehicle and construction equipment staging and maintenance areas will be located away from all drainage ways with their parking areas graded so the runoff from these areas is collected, contained and treated prior to discharge from the site.
3. Provide sanitary facilities for on-site personnel.
4. Store, cover, and isolate construction materials including topsoil, and chemicals, to prevent runoff of

pollutants and contamination of groundwater and surface waters.

5. Develop and implement a spill prevention and control plan. The plan should include NYSDEC's spill reporting and initial notification requirements.
6. Provide adequate disposal for solid waste including woody debris, stumps, and other construction waste and include these methods and directions in the construction details on the site construction drawings. Fill, woody debris, stumps and construction waste shall not be placed in regulated wetlands, streams or other surface waters.
7. Distribute or post informational material regarding proper handling, spill response, spill kit location, and emergency actions to be taken, to all construction personnel.
8. Refueling equipment shall be located at least 100 feet from all wetlands, streams and other surface waters.



STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS



Definition & Scope

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile: The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be

inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

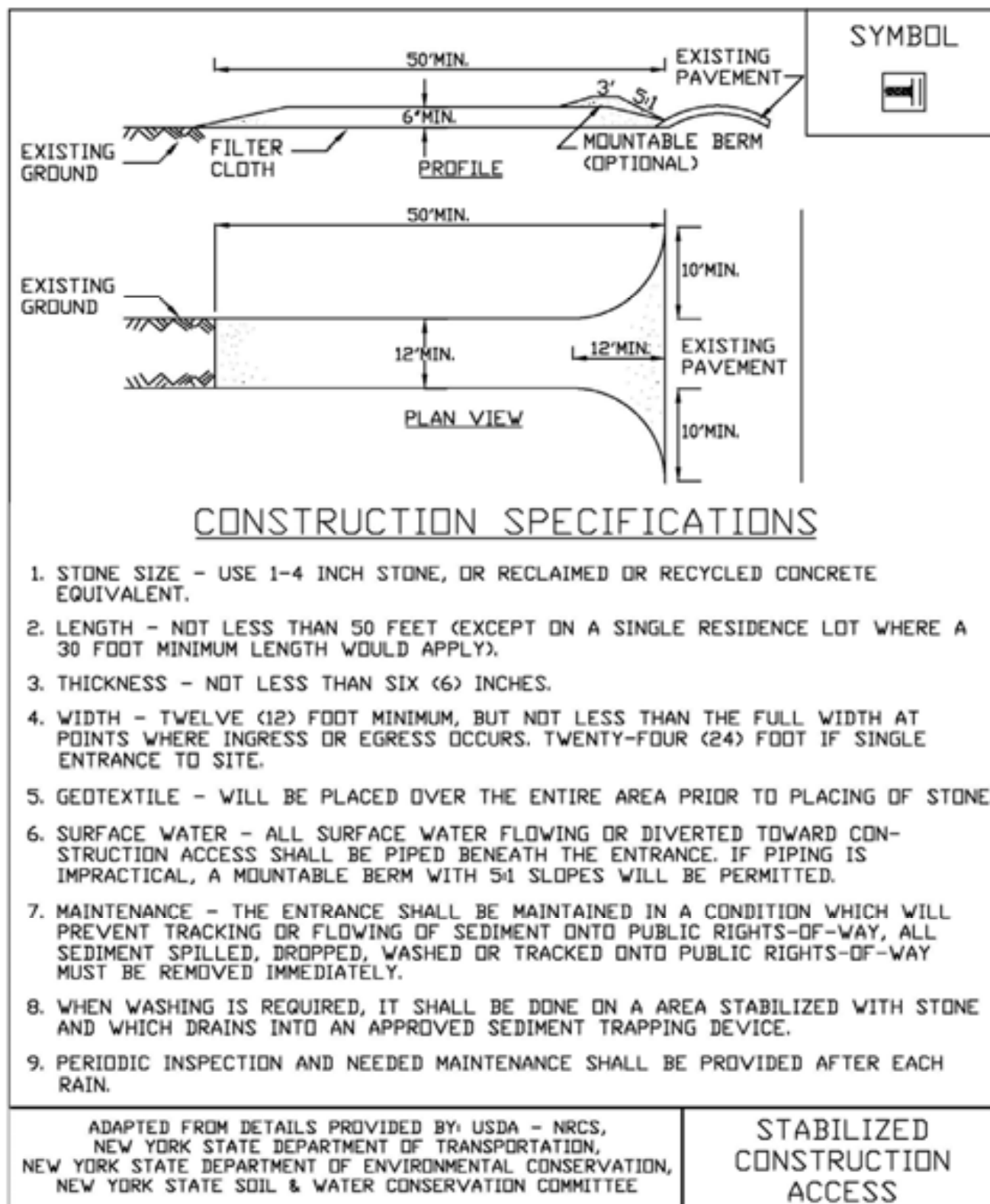
Fabric Properties ³	Light Duty ¹ Roads Grade Sub-grade	Heavy Duty ² Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-
¹ Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent. ² Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent. ³ Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.			

Maintenance

The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 2.1
Stabilized Construction Access



STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION



Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

- I. Excavated Drop Inlet Protection
- II. Fabric Drop Inlet Protection
- III. Stone & Block Drop Inlet Protection
- IV. Paved Surface Inlet Protection
- V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed

drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved. This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection



This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to

unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet (“doughnut”). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all

materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection



This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.



The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection



The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection

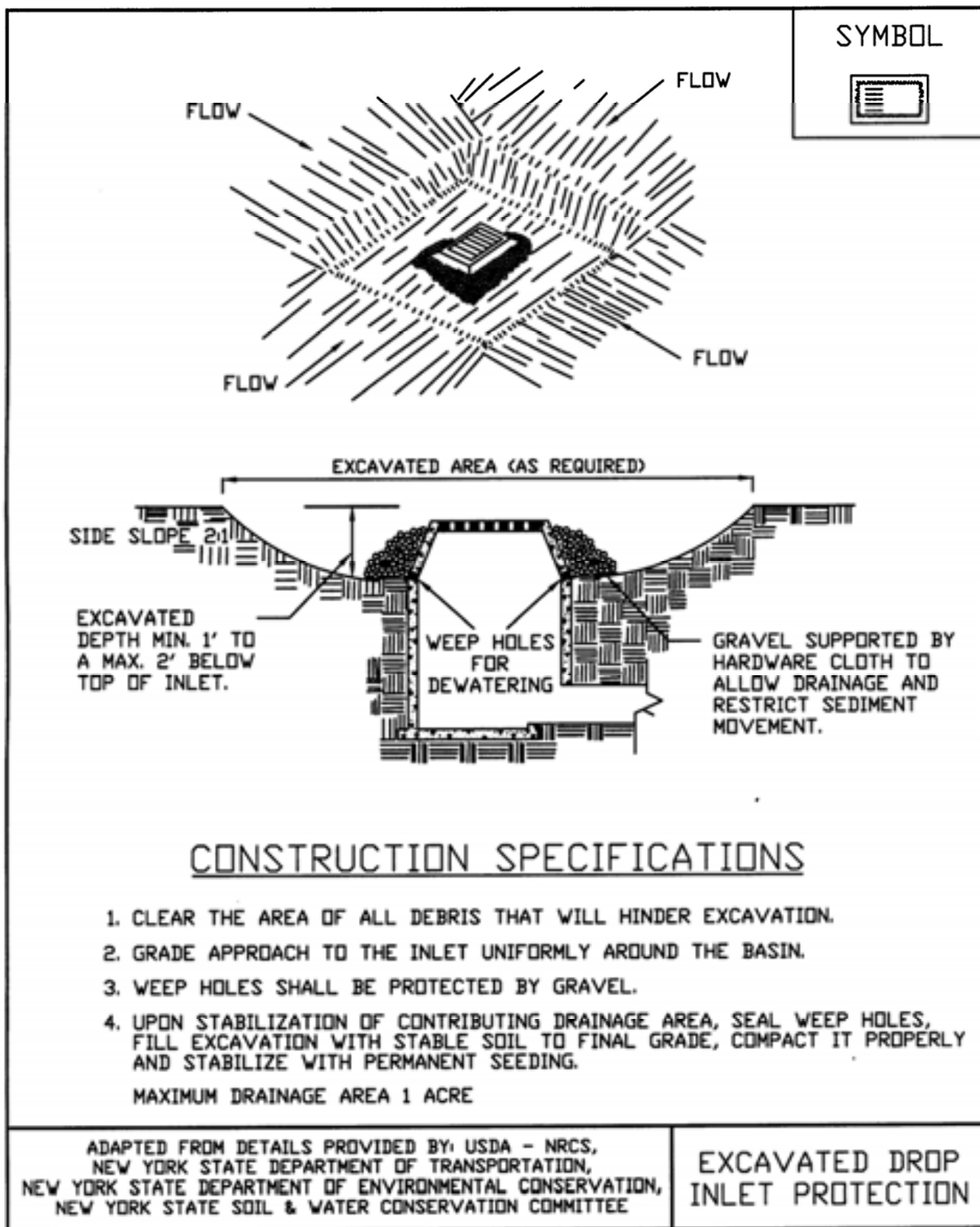


Figure 5.32
Fabric Drop Inlet Protection

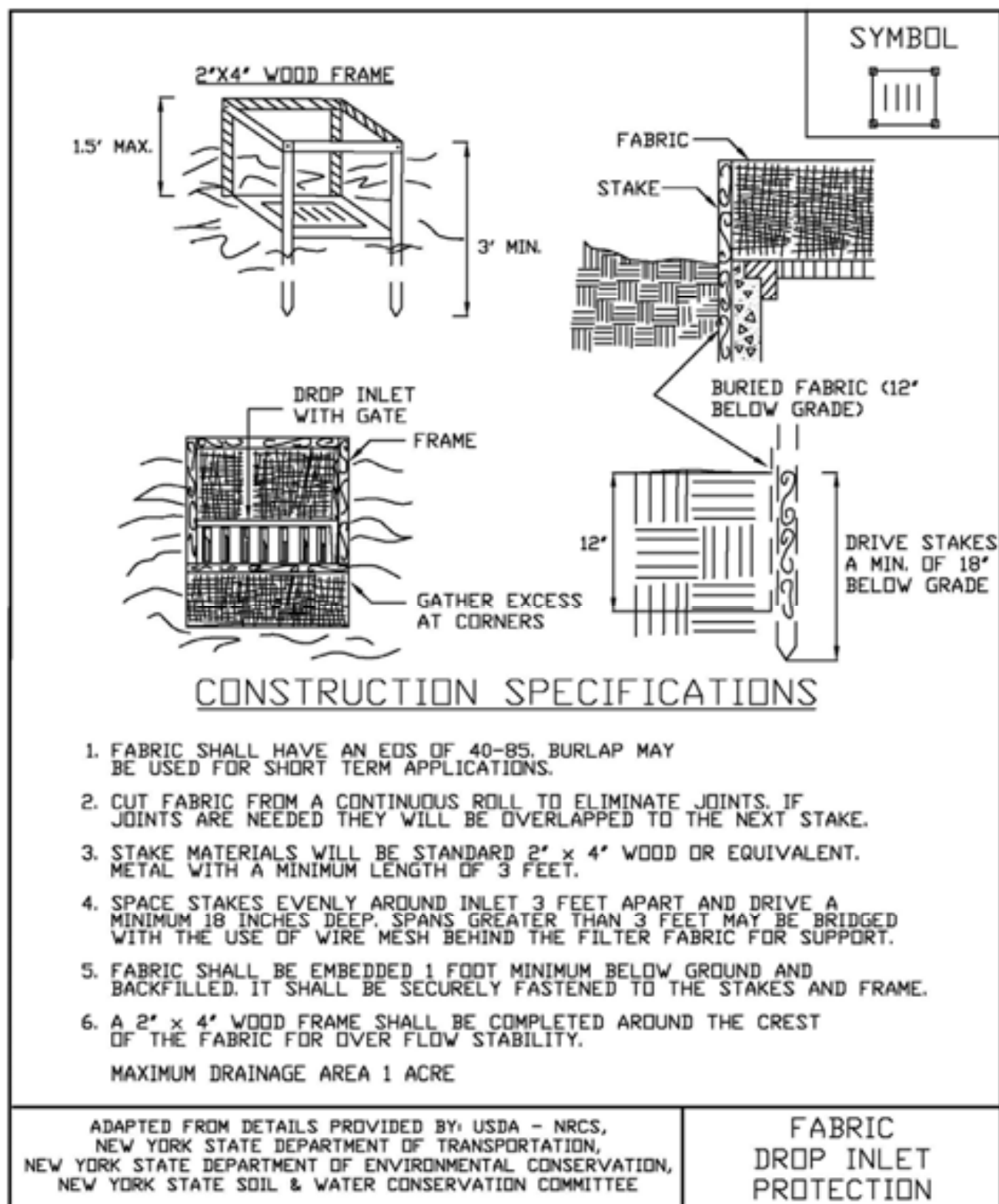
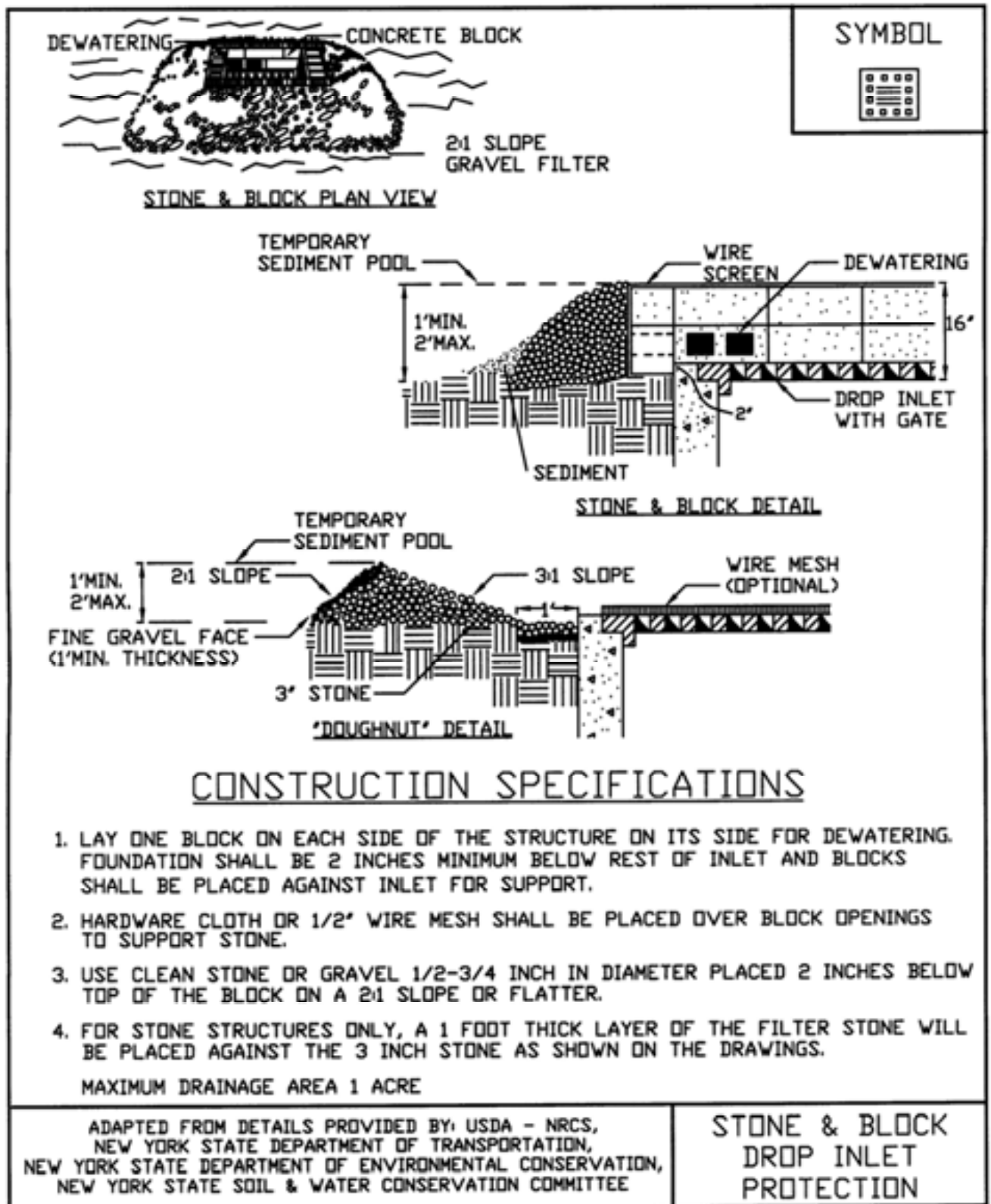


Figure 5.33
Stone & Block Drop Inlet Protection



STANDARD AND SPECIFICATIONS FOR TEMPORARY CONSTRUCTION AREA SEEDING



Definition & Scope

Providing temporary erosion control protection to disturbed areas and/or localized critical areas for an interim period by covering all bare ground that exists as a result of construction activities or a natural event. Critical areas may include but are not limited to steep excavated cut or fill slopes and any disturbed, denuded natural slopes subject to erosion.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).

IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding and can be a hazard to young wildlife species.

STANDARD AND SPECIFICATIONS FOR TURBIDITY CURTAIN



Definition & Scope

A **temporary** flexible, impenetrable barrier used to trap sediment in water bodies. This curtain is weighted at the bottom to achieve closure while supported at the top through a flotation system and used to prevent the migration of silt from a work site in a water environment into the larger body of water. Top bar float has to support weight of curtain material. Bottom anchor has to be flexible so that it will lie along the contour of the water body bottom.

Condition Where Practice Applies

A turbidity curtain is generally used when construction activity occurs within a waterbody or along its shoreline and is of short duration, generally less than one month. Curtains are used in calm water surfaces and not in areas of flowing water. **Turbidity curtains are not to be used across flowing watercourses.**

Design Criteria

The turbidity curtain shall be located beyond the lateral limits of the construction site and firmly anchored in place. The alignment should be set as close to the work area as possible but not so close as to be disturbed by applicable construction equipment. The height of the curtain shall be 20 percent greater than the depth of the water to allow for water level fluctuations. The area that the turbidity curtain protects shall not contain large culverts or drainage areas that if flows occur behind the curtain would cause a breach or lost contact at the bottom surface.

If water depths at the design alignment are minimal, the toe can be anchored in place by staking.

See Figure 5.35 on page 5.66.

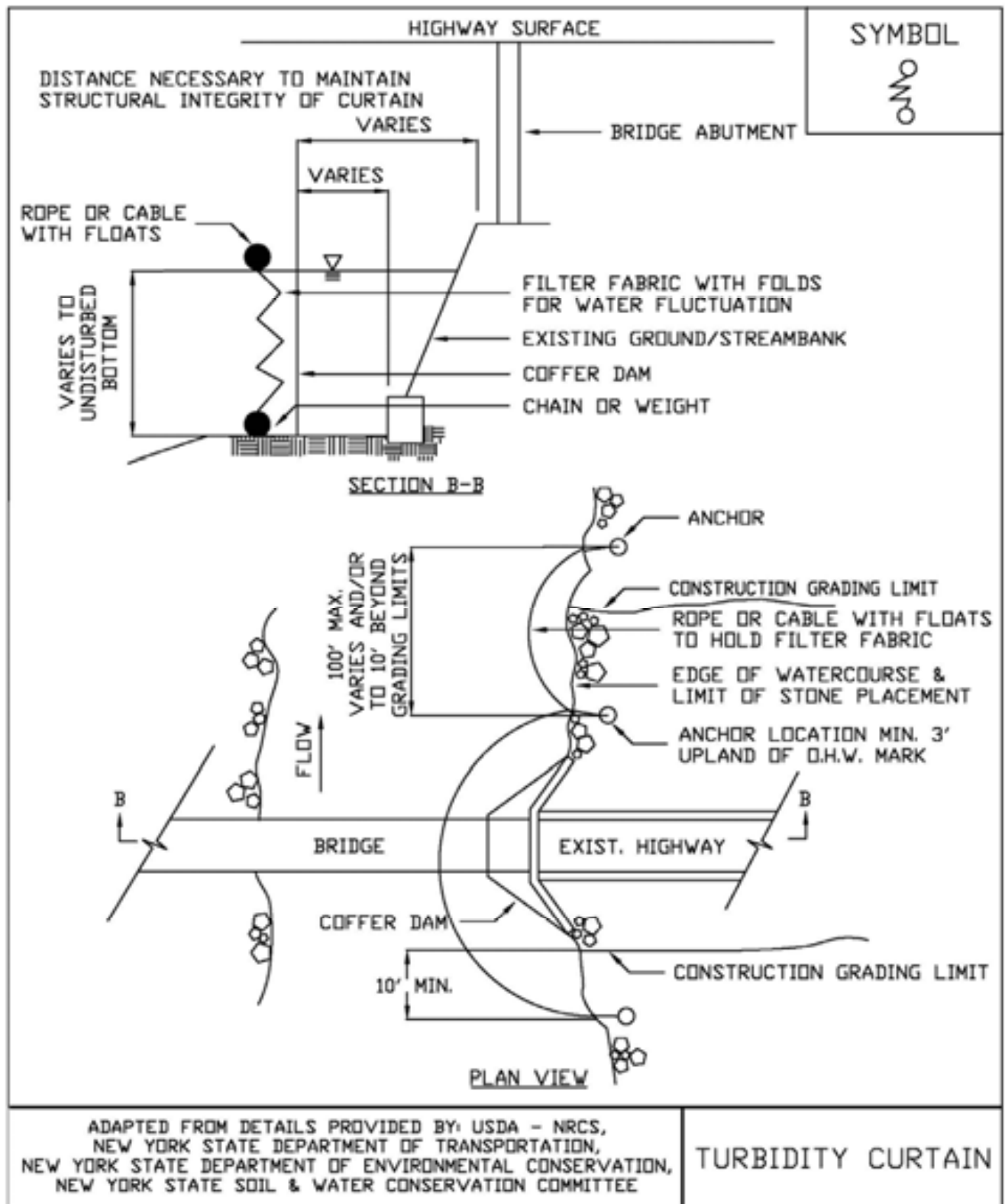
Construction Specifications

The area of proposed installation of the curtain shall be inspected for obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment. All materials shall be removed so they cannot enter the waterbody. Shallow installations can be made by securing the curtain by staking rather than using a flotation system. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances such as boats and wave action by winds.

Maintenance

The turbidity curtain shall be inspected daily and repaired or replaced immediately. It is not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt is stabilized away from the waterbody. The barrier shall be removed by carefully pulling it toward the construction site to minimize the release of attached sediment. Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain. If the curtain is oriented in a manner that faces the prevailing winds, frequent checks of the anchorage shall be made.

Figure 5.35
Turbidity Curtain



APPENDIX G

Pre-Construction Documents & Certifications

PRE-CONSTRUCTION DOCUMENTS

Project Name: 2731 West 12th Street

Name of Owner/Developer: Prologis

Name of Preparer: Langan Engineering, Environmental, Surveying, Landscape Architecture, and Geology, D.P.C.

Preamble to Site Assessment and Inspections

The following information to be read by all person's involved in the construction of stormwater related activities:

A qualified professional shall conduct an assessment of the site prior to the development activity (1) and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Preparer shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days or within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections), except as otherwise required during "temporary shutdown". The developer shall maintain a record of all inspection reports in this **site logbook**. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The developer shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

A qualified professional shall perform a final site inspection. The qualified professional shall certify that the site had undergone final stabilization (2) using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, a qualified professional must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

The Owner, qualified inspector and qualified professional must submit a Notice of Termination Request to NYCDEP via the SWPTS. DEP may inspect the site to confirm that it meets the requirements of the NOT. If post construction practices are present an application for a Stormwater Maintenance Permit must also be submitted via SWPTS.

- (1) "Development activity" means soil disturbance on a site including but not limited to land contour work, clearing, grading, excavation, demolition, construction, reconstruction, new development, redevelopment, creation or replacement of impervious surface, stockpiling activities or placement of fill. Clearing activities include but are not limited to the cutting and skidding of trees, stump removal and brush root removal. Such term does not include routine maintenance (such as road resurfacing) that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.
- (2) "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

PRE-CONSTRUCTION CERTIFICATIONS

Owner's Certification

I certify that I am the Owner of this property and have read or been advised of the applicable sections of the Rules of the City of New York (RCNY) Title 15, Chapter 19.1 and I believe that I understand them. I also understand that, under RCNY, I am responsible for submitting a fee to initiate review of the stormwater pollution prevention plan (SWPPP). I hereby certify that this SWPPP and all associated documentation provided were prepared under my direction or supervision. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings. I also understand that, by submitting this application, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction.

Name (please print): Sheila Sutton

Title: VP, Development Officer

Date: 10/18/24

Address: One Meadowlands Plaza, Suite 100, East Rutherford, NJ 07073

Phone: (201) 635-6006

Email: ssutton@prologis.com

Signature: 

Developer's Certification

I have read or been advised of the applicable sections of RCNY Title 15 Chapter 19.1 and believe that I understand them. I also understand that, under the RCNY I am responsible for submitting a fee to initiate review of this application. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings. I also understand that, by submitting this application, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction.

Name (please print): Sheila Sutton

Title: VP, Development Officer

Date: _____

Address: One Meadowlands Plaza, Suite 100, East Rutherford, NJ 07073

Phone: (201) 635-6006

Email: ssutton@prologis.com

Signature: 

Stormwater Pollution Prevention Plan
2731 West 12th Street
2731 West 12th Street, Brooklyn NY
Langan Project No.: 170697301

November 1, 2024
Page 4 of 4

SWPPP Preparer Certification


I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project was prepared by me or under my direct supervision in accordance with the RCNY Title 15 Chapter 19.1 and terms and conditions of the most recent NYSDEC SPDES General Permit for Stormwater Discharges from Construction Sites. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the City New York and could subject me to criminal, civil and/or administrative proceedings.

Name (please print): _____ Michele O'Connor _____

Title: _____ Senior Principal _____ **Date:** _____ 12-20-2024 _____

Address: _____ 368 Ninth Avenue, 8th Floor, New York, NY 10001 _____

Phone: _____ (212) 479-5400 _____ **Email:** _____ moconnor@langan.com _____

Signature: _____  _____

APPENDIX H

Construction Duration Inspections

CONSTRUCTION DURATION INSPECTION FORM 2731 West 12th Street

Instructions for Qualified Inspector:

- Inspection Forms will be filled out during the entire construction phase of the project.
- Complete inspections must include:
 - An inspection form
 - A site plan showing the areas under active construction
 - Color Photos with date and time stamps showing any deficiencies or corrections to previous deficiencies
 - The signature of the Qualified Inspector (QI) and Qualified Professional

Required Elements:

- On a site map, indicate the extent of all disturbed site areas and drainage pathways.
 - Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 7-day period.
 - Indicate, on a site map, all areas of the site that have undergone temporary or permanent stabilization.
 - Indicate all disturbed site areas that have not undergone active site work during the previous 7-day period.
- Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, and 50 percent).
- Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (e.g. earthen berms or silt fencing) and containment systems (sediment basins and sediment traps).
- Identify all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.
- Identify current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards
- Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching.
- Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated risers pipes to pass water.
- Immediately report to the Owner or Contractor any deficiencies that are identified with the implementation of the SWPPP.
- Take color photos with time and date stamps of any identified deficiencies or corrections to previous deficiencies
- Include identification and status of all corrective actions that were required by previous inspection; and
- Contractor shall maintain an onsite record of all inspection documents and reports in the site log book.

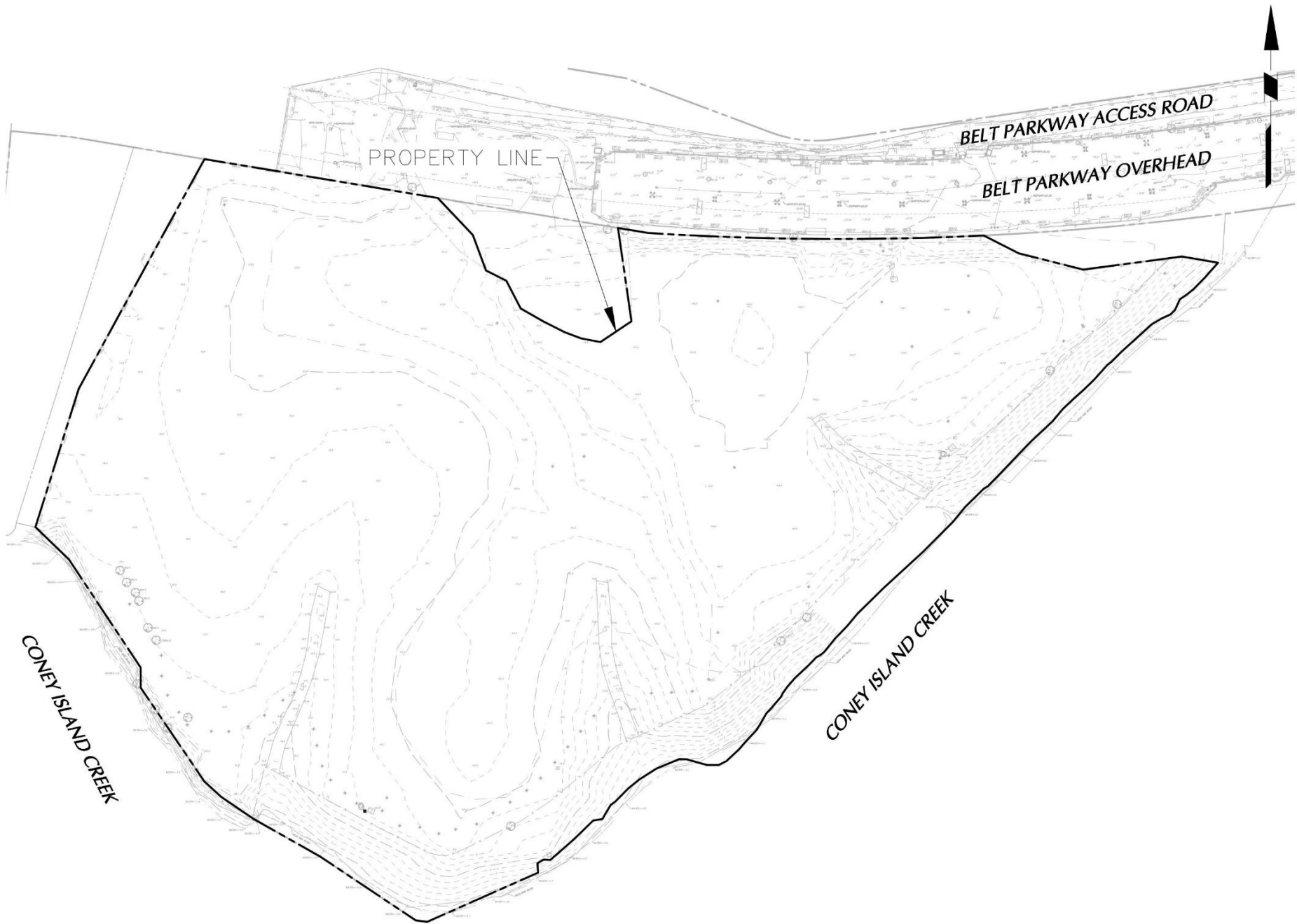
cc:		By:	

CONSTRUCTION DURATION INSPECTION FORM
2731 WEST 12TH STREET

SITE PLAN/SKETCH:

Provide a concise sketch indicating construction activities, location and description of stormwater runoff from the site, stabilization activities, and soil erosion and sediment control BMPs. Indicate areas of disturbance at the time of inspection, areas that have been temporarily or permanently stabilized since the last inspection. Indicate BMPs improperly installed or in need of repair.

Refer to SWPPP Drawings C-100, C-101, and C-201 for the site soil erosion and sediment controls and standard details (prepared by Langan, last revised 10/17/2024)



CC:

By:

CONSTRUCTION DURATION INSPECTION FORM 2731 WEST 12TH STREET

PROJECT No.:	170697301	DATE:	
PROJECT:	2731 West 12 th Street	WEATHER:	
LOCATION:	2731 West 12 th Street, Brooklyn New York	TIME:	
QUALIFIED INSPECTOR: Name: _____ Trainee SWT# _____ Signature: _____ Working under the direct supervision of Michele O'Connor, PE NYS License # 086302 - LANGAN		QUALIFIED PROFESSIONAL: Michele O'Connor, PE NYS License # 086302 - LANGAN Signature: _____	
SPDES PERMITTEE/TITLE/ADDRESS/PHONE/EMAIL:		CONTRACTOR:	
INSPECTION TYPE: <input type="checkbox"/> 7 Calendar Days <input type="checkbox"/> 30 Calendar Days <input type="checkbox"/> Inspection After 0.5-inch Rainfall <input type="checkbox"/> 2 – Inspection in 7 Days		SOIL CONDITION: (DRY, WET, SATURATED, ETC.)	STAGE OF CONSTRUCTION: _____ %
ADDITIONAL OBSERVATIONS AND DISCUSSIONS			
CC:		By:	

"Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.", or "Langan Engineering and Environmental Services, Inc.", or "Langan International, LLC", or "Langan Engineering & Environmental Services, Inc., PC" (collectively "Langan").

File Path: d Reports

\\angan.com\data\NYC\data3\170697301\Project Data\Discipline\Site Civil\Reports\NYSDEC SWPPP\Appendices\Appendix N - Construction Duration Inspections\Appendix L - Construction Duration Inspection Form.docx

CONSTRUCTION DURATION INSPECTION FORM 2731 WEST 12TH STREET

Maintaining Water Quality

Yes No N/A

- ☐ ☐ ☐ Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
- ☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules or grease?
- ☐ ☐ ☐ All disturbance is within the limits of the approved plans.
- ☐ ☐ ☐ Have receiving lake/bay, stream, and/or wetland been impacted by silt from the project?

Housekeeping

1. General Site Conditions

Yes No N/A

- ☐ ☐ ☐ Is construction site litter and debris appropriately managed?
- ☐ ☐ ☐ Are facilities and equipment necessary for implementation or erosion and sediment control in working order and/or properly maintained?
- ☐ ☐ ☐ Is construction impacting the adjacent property?
- ☐ ☐ ☐ Is dust adequately controlled?

Soil Stabilization

1. Soil Stockpiles

Yes No N/A

- ☐ ☐ ☐ Stockpiles are covered at the end of the work day with minimum 6 mil plastic sheeting or tarps.
- ☐ ☐ ☐ Maximum size of stockpile is 1,000 cubic yards
- ☐ ☐ ☐ Stockpiles located at least 50-ft from slope, roadway, streams, wetlands, and drainage facilities.

2. Revegetation

Yes No N/A

- ☐ ☐ ☐ Temporary seeding and mulch have been applied to idle areas.
- ☐ ☐ ☐ 4 inches minimum of topsoil has been applied under permanent seeding.

Sediment Control Practices

1. Stabilized Construction Access

Yes No N/A

- ☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.
- ☐ ☐ ☐ Installed per standards and specifications?
- ☐ ☐ ☐ Does all traffic use the stabilized entrance or to enter and leave site?
- ☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

2. Storm Drain Inlet Protection (Use for Stone & Block, Filter Fabric, or Excavated Practices)

Yes No N/A

- ☐ ☐ ☐ Installed around inl.
- ☐ ☐ ☐ Installed per manufacturer's specifications?
- ☐ ☐ ☐ Accumulated sediment is less than 1/2 above ground height of the sock.

CC:		By:	

CONSTRUCTION DURATION INSPECTION FORM 2731 WEST 12TH STREET

- ☐ ☐ ☐ Maintained in accordance with manufacturer's requirements?
☐ ☐ ☐ Silt sock is stable, without rips or frayed areas.
☐ ☐ ☐ Within recommended use period? (6 months for biodegradable, 1 year photodegradable, manufacturer recommendation for propylene)

Sediment accumulation is ____% of design capacity.

3. Concrete Truck Washout Facility

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Plastic liner has no visible holes or tears and is anchored beyond top of pit. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Facility is minimum 8'W x 8'L x 2'H. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excavated side slopes are 2:1. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Facility is located minimum 100' from drainage swales, storm drain inlets, wetlands, streams, and other surface waters. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Signs are provided to direct drivers to facility after discharging load. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Hardened concrete is less than 75% of storage capacity. |

4. Dust Control

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water sprinkling is being used to control excessive dust. |

5. Surface Stabilization

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Soils are not exposed at final condition. |

6. Staging & Equipment Storage Areas

- | Yes | No | N/A | |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Areas are kept clear and sediment is not tracked off-site. |

CC:		By:	

CONSTRUCTION DURATION INSPECTION FORM
2731 WEST 12TH STREET

INSPECTION PHOTOS:

Attach digital photographs (with date and time stamp) that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained on site within seven calendar days of the date of the inspection.

CC:		By:	

"Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.", or "Langan Engineering and Environmental Services, Inc.", or "Langan International, LLC", or "Langan Engineering & Environmental Services, Inc., PC" (collectively "Langan").

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the State and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in;
 - a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
 - b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

TRAINED CONTRACTOR'S DAILY INSPECTION LOG

Date and Time: _____

Weather Conditions: _____

Soil Conditions (dry/wet/saturated): _____

Runoff Conditions: _____

Stage of Construction: ____% complete

Erosion and Sediment Control Practices installed as per SWPPP?

Yes No

[] []

Erosion and Sediment Control Practices maintained as per SWPPP?

Yes No

[] []

Erosion and Sediment Control Practice Deficiencies:

Corrective Actions:

Trained Contractor (print name)

Trained Contractor Signature

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Complete the table below to provide documentation that the personnel required to be trained have completed the appropriate training.

[illegible]

APPENDIX I

Monthly Summary Reports

Monthly Summary of Site Inspection Activities

Name of Facility:	Today's Date:	Reporting Month:
Location:		
Name of Site Inspector:	Telephone # of Site Inspector:	

Date Of Inspection	Regular / Rainfall Based Inspection	Name of Inspector	Items of Concern	Corrective Action Taken Y/N

Qualified Professional's Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings."

Qualified Professional (print name)

Qualified Professional Signature

APPENDIX J

Contractor's Certifications and Forms

CONTRACTOR'S CERTIFICATION STATEMENT

I. SITE INFORMATION

Construction Site Name: _____

Site Location: _____

II. CONTRACTORS INFORMATION

Contracting Firm: _____

Contracting Firm Address: _____

Telephone Number(s): _____

Contact(s): 1) _____

2) _____

III. STORMWATER MEASURES

Contractor is responsible for all stormwater pollution prevention measures described within the SWPPP and Erosion and Sediment Control Plan, but not limited to the following storm water measures.

1. _____ 4. _____ 7. _____

2. _____ 5. _____ 8. _____

3. _____ 6. _____ 9. _____

IV. CERTIFICATION

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the developer must comply with the terms and conditions of the NYC Stormwater Construction Permit, the most current version of the New York State Pollutant Discharge Elimination System (SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Contractor (print name): _____

Signature: _____

Title: _____

Date: _____

SUBCONTRACTOR'S CERTIFICATION STATEMENT

I. SITE INFORMATION

Construction Site Name: _____

Site Location: _____

II. CONTRACTORS INFORMATION

Contracting Firm: _____

Contracting Firm Address: _____

Telephone Number(s): _____

Contact(s): 1) _____

2) _____

III. STORMWATER MEASURES

Subcontractor is responsible for all stormwater pollution prevention measures described within the SWPPP and Erosion and Sediment Control Plan, but not limited to the following storm water measures.

1. _____ 4. _____ 7. _____

2. _____ 5. _____ 8. _____

3. _____ 6. _____ 9. _____

IV. CERTIFICATION

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the developer must comply with the terms and conditions of the NYC Stormwater Construction Permit, the most current version of the New York State Pollutant Discharge Elimination System (SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Subcontractor (print name): _____

Signature: _____

Title: _____

Date: _____

CERTIFICATE OF ISSUANCE

As directed by the developer, a copy of the SWPPP will be retained at the site, along with all signed statements, reports and schedules contained herein for completion by the contractor. Upon completion, the SWPPP and all records shall be returned to the developer.

Date of issuance: _____

Name: _____

Title: _____

Firm: _____

Signature: _____

Received from:

Name: _____

Title: _____

Firm: _____

Address: 368 Ninth Ave., 8th Floor, New York, NY 10001

Tel. Number(s): (212) 479-5400

Signature: _____

(Note: Inquiries in regards to copies of SWPPP by either the State Director or any local agency having jurisdiction to be directed to owner's project representative.)

EROSION AND WATER QUALITY CONTROL IDENTIFICATION

The contractor and/or subcontractors that will implement each erosion control measure must be identified:

IDENTIFICATION

NAME OF CONTRACTOR AND/OR SUBCONTRACTOR	MEASURE TO BE IMPLEMENTED

(Note: Each contractor and subcontractor identified must sign a copy of the certification statement. Those copies must be filed with the SWPPP, kept on-site, and kept up to date.

This identification does not reassign or remove responsibility for all measures as agreed to the contract documents. The contractor is responsible for all subcontractors.)

CONSTRUCTION STABILIZATION

The contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased. When construction activity is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

THE CONTRACTOR IS RESPONSIBLE TO KEEP THE FOLLOWING RECORDS:

MAJOR WORK ACTIVITY	PORTION OF THE SITE	DATE COMMENCED	DATE CEASED (PERMANENTLY OR TEMPORARILY)	DATE STABILIZATION MEASURES INITIATED

THESE MUST BE KEPT UP TO DATE AND ON-SITE FOR INSPECTION AT ANYTIME.

CERTIFICATE OF CHANGE BY THE CONTRACTOR

To: _____

Project: _____

Site Address: _____

Enclosed, please find your written notification of the following provision(s) of the SWPPP not being met:

Provisions of the plan requiring modification:

Action taken to modify plan to bring project into compliance:

Date Completed: _____

Received By: _____

Name: _____

Title: _____

Contracting Firm: _____

Address: _____

Phone Number: _____

Signature: _____

Received By: _____

Name: _____

Title: _____

Contracting Firm: _____

Address: _____

Phone Number: _____

Signature: _____

(Note: Plan amendments – major and minor need to be filed on-line. Major amendments include changes to structural components that would require design review. All others shall be filed as a minor amendment, but will not require review.)

The contractor shall document all pollutant generating activities, including potential pollutants and where they will be stored on-site.

[illegible]

APPENDIX K

End of Construction Document

FINAL STABILIZATION AND RETENTION OF RECORDS

- A. Qualified Professional Certification: A qualified professional shall perform a final site inspection.

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Final site drainage will prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conveyance systems are stabilized.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Channels and stream banks are seeded at the outlet points.

"I hereby certify that the site has undergone final stabilization. Final stabilization means that all soil disturbing activities have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures. Further, all temporary erosion and sediment controls (such as silt fence) not specified for permanent erosion control have been removed. I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the City and State of New York and could subject me to criminal, civil and/or administrative proceedings. "

Qualified Professional (print name): _____

Qualified Professional Signature: _____

Date: _____

- B. Retention of Records: The owner/developer shall retain copies of SWPPPs, all reports, and records of all data for a period of at least five years from the date that the site is finally stabilized.
- C. Maintenance of SWPPP and Reports at the Construction Site: The contractor shall retain a copy of the SWPPP at the construction site from the data of initiation of construction activities to the date of final stabilization.

CERTIFICATE OF RETURN

As directed by the owner's representative, the copy of the storm water pollution prevention plan retained at the site, along with all signed statements, reports and schedules contained herein for completion by the contractor are to be returned to the owner. The owner shall retain the plan, reports and records of all data for a period of three years from the date that the site is stabilized. This period may be extended by the State director at any time upon written notification.

Date of issuance: _____

Name: _____

Title: _____

Firm: _____

Signature: _____

Received by:

Name: _____

Title: _____

Address: _____

Tel. Number(s): _____

Signature: _____

(Note: Inquiries in regard to copies of pollution prevention plan by either the State Director or any local agency having jurisdiction to be directed to owner's project representative.)

APPENDIX L

Copy of SPDES General Permit



Department of
Environmental
Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

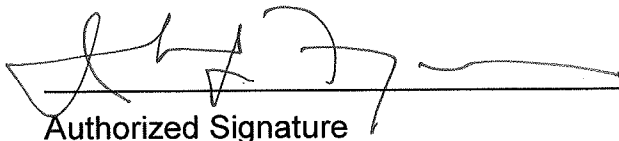
Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator


Authorized Signature

1-23-20
Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act (“CWA”), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System (“NPDES”)* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of “*construction activity*”, as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM
CONSTRUCTION ACTIVITIES**

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Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;
2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State*.
3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

Discharges authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge of pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

- a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge of pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:
- (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;
 - (ii) Control stormwater *discharges*, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;
 - (iii) *Minimize* the amount of soil exposed during *construction activity*;
 - (iv) *Minimize* the disturbance of *steep slopes*;
 - (v) *Minimize* sediment *discharges* from the site;
 - (vi) Provide and maintain *natural buffers* around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharges*, unless *infeasible*;
 - (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;
 - (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and
 - (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.
- b. **Soil Stabilization.** In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments

listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

- c. **Dewatering.** *Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, must be managed by appropriate control measures.*
- d. **Pollution Prevention Measures.** Design, install, implement, and maintain effective pollution prevention measures to *minimize the discharge of pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:
 - (i) *Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;*
 - (ii) *Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and*
 - (iii) *Prevent the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.*
- e. **Prohibited Discharges.** The following *discharges* are prohibited:
 - (i) *Wastewater from washout of concrete;*
 - (ii) *Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;*

- (iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;
 - (iv) Soaps or solvents used in vehicle and equipment washing; and
 - (v) Toxic or hazardous substances from a spill or other release.
- f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual (“Design Manual”), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices (“SMPs”) are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.
2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

- (i) Runoff Reduction Volume (“RRv”): Reduce the total Water Quality Volume (“WQv”) by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.
- (ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual.

The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

- (iii) Channel Protection Volume (“Cpv”): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
 - (1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
 - (2) The site discharges directly to tidal waters, or fifth order or larger streams.
- (iv) *Overbank* Flood Control Criteria (“Qp”): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
 - (1) the site discharges directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that *overbank* control is not required.
- (v) Extreme Flood Control Criteria (“Qf”): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
 - (1) the site discharges directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that *overbank* control is not required.

b. Sizing Criteria for New Development in Enhanced Phosphorus Removal Watershed

- (i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be

calculated in accordance with the criteria in Section 10.3 of the Design Manual.

- (ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

- (iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
 - (1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
 - (2) The site *discharges* directly to tidal waters, or fifth order or larger streams.
- (iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
 - (1) the site *discharges* directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that *overbank* control is not required.
- (v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
 - (1) the site *discharges* directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

- (i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.
 - (1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
 - (2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRV capacity., or
 - (3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
 - (4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

- (ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.
- (iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.
- (iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharges* necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;
2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and
3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharges* authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharges* authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharges* will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.
2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharges*; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.
3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: “Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned”; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharges* from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.
4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **not** authorized by this permit:

1. *Discharges* after *construction activities* have been completed and the site has undergone *final stabilization*;
2. *Discharges* that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;
3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;
4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;
6. *Construction activities* for residential, commercial and institutional projects:
 - a. Where the *discharges* from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and
 - b. Which are undertaken on land with no existing *impervious cover*; and
 - c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.
7. *Construction activities* for linear transportation projects and linear utility projects:
 - a. Where the *discharges* from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and
 - b. Which are undertaken on land with no existing *impervious cover*; and
 - c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:
- a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.
 - 1-5 acres of disturbance - 20 feet
 - 5-20 acres of disturbance - 50 feet
 - 20+ acres of disturbance - 100 feet, or
 - b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
 - (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
 - (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
 - (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
 - (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or
 - c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

- (i) No Affect
- (ii) No Adverse Affect
- (iii) Executed Memorandum of Agreement, or

d. Documentation that:

- (i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharges from construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.
2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.
3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of Owner or Operator) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*. This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (<http://www.dec.ny.gov/>). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

**NOTICE OF INTENT
NYS DEC, Bureau of Water Permits
625 Broadway, 4th Floor
Albany, New York 12233-3505**

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.
3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.
4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.
2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:
 - a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (<http://www.dec.ny.gov/>) for more information,
 - b. where required, all necessary Department permits subject to the *Uniform Procedures Act* ("UPA") (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators of construction activities* that are required to obtain UPA permits

must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

- c. the final SWPPP has been prepared, and
 - d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.
3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:
- a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:
 - (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or
 - (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;
 - (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

- b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:
 - (i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed “MS4 SWPPP Acceptance” form, or
 - (ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed “MS4 SWPPP Acceptance” form.
- 4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

- 1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination (“NOT”) has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.
- 2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor’s or subcontractor’s certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.
- 3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land*

use control MS4, the regulated, traditional land use control MS4 (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

- a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
 - b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.
 - c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.
 - d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.
 - e. The *owner or operator* shall include the requirements above in their SWPPP.
4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..
 5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.
 6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of a *construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4*, the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.
2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.
3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.
2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.
3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.
4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:
 - a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

- b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;
 - c. to address issues or deficiencies identified during an inspection by the *qualified inspector*, the Department or other regulatory authority; and
 - d. to document the final construction conditions.
5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.
6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor*. The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with

the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharges* from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:
 - a. Background information about the scope of the project, including the location, type and size of project

- b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge(s)*;
- c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);
- d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;
- e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;
- f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;
- g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;
- h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;
- i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection

schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

- j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;
 - k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and
 - l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.
2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

The post-construction stormwater management practice component of the SWPPP shall include the following:

- a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

- b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;
- c. A Stormwater Modeling and Analysis Report that includes:
 - (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;
 - (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;
 - (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;
 - (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;
 - (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and
 - (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;
- d. Soil testing results and locations (test pits, borings);
- e. Infiltration test results, when required; and
- f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria*, Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators of construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators of the construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.
2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.
3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
 - Certified Professional in Erosion and Sediment Control (CPESC),
 - New York State Erosion and Sediment Control Certificate Program holder
 - Registered Landscape Architect, or
 - someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].
1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:
 - a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located

in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

- b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;
 - c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and
 - d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:
- a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.
 - b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
 - c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

- d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4*, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization*, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the “*Final Stabilization*” and “*Post-Construction Stormwater Management Practice*” certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.
 - e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization*, all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.
 4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

- a. Date and time of inspection;
- b. Name and title of person(s) performing inspection;
- c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;
- d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
- e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;
- f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;
- g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;
- h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;
- i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;
- j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);
- k. Identification and status of all corrective actions that were required by previous inspection; and

- I. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.
5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.
6. All inspection reports shall be signed by the *qualified inspector*. Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.
2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:
 - a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

- b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;
 - c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.
 - d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.
3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the “*Final Stabilization*” and “Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.
4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the “MS4 Acceptance” statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector’s* final site inspection certification(s) required in Part V.A.3. of this permit.
5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:
- a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

- b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),
- c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,
- d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator*, its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to \$37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit, or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:
 - a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

- (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
 - (ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
 - b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or
 - c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 - (i) the chief executive officer of the agency, or
 - (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field,

superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

- c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.
3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.
4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4*, or by a duly authorized representative of that person.

It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge(s)*, the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the owner's or operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.
4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.
2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property – means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “*Construction Activity(ies)*” also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for “*Commence (Commencement of) Construction Activities*” and “*Larger Common Plan of Development or Sale*” also.

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system

and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment – means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department’s rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;
- (ii) Designed or used for collecting or conveying stormwater;
- (iii) Which is not a *combined sewer*; and
- (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer – means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the “Required Elements” sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank Flood* (Qp), and *Extreme Flood* (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture (“USDA”) Soil Survey as Soil Slope Phase “D”, (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint sources*. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint sources*, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed

training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

<p>The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:</p> <ul style="list-style-type: none">• Single family home <u>not</u> located in one of the watersheds listed in Appendix C or <u>not directly discharging</u> to one of the 303(d) segments listed in Appendix E• Single family residential subdivisions with 25% or less impervious cover at total site build-out and <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E• Construction of a barn or other <i>agricultural building</i>, silo, stock yard or pen.
<p>The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:</p> <p>All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.</p>
<p>The following construction activities that involve soil disturbances of one (1) or more acres of land:</p> <ul style="list-style-type: none">• Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains• Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects• Pond construction• Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover• Cross-country ski trails and walking/hiking trails• Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development;• Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path.• Slope stabilization projects• Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

**Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP
THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS**

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES
POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development conditions*
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

**CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES
POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES**

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover*, and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual (“Design Manual”).

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

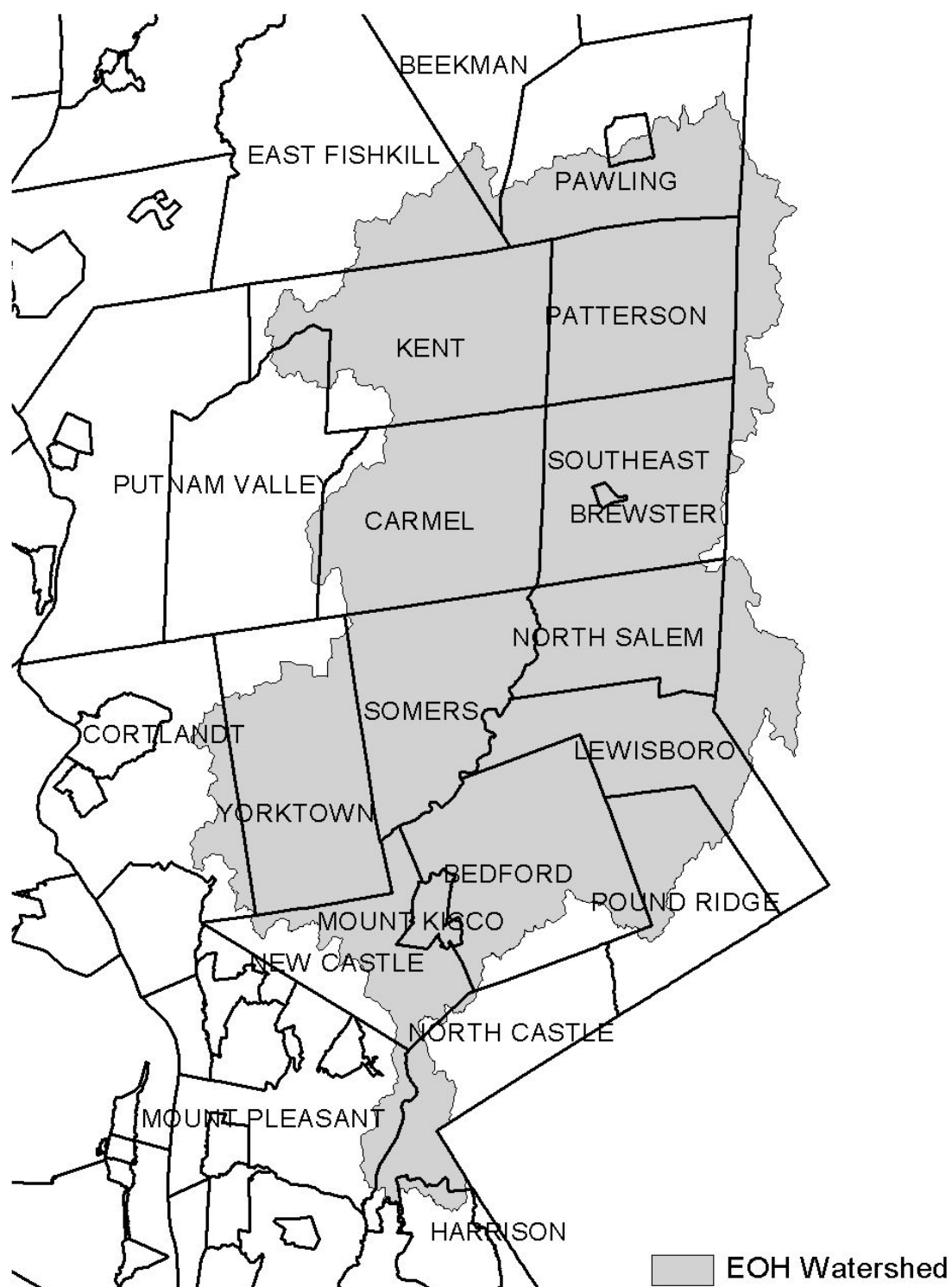
Figure 1 - New York City Watershed East of the Hudson

Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

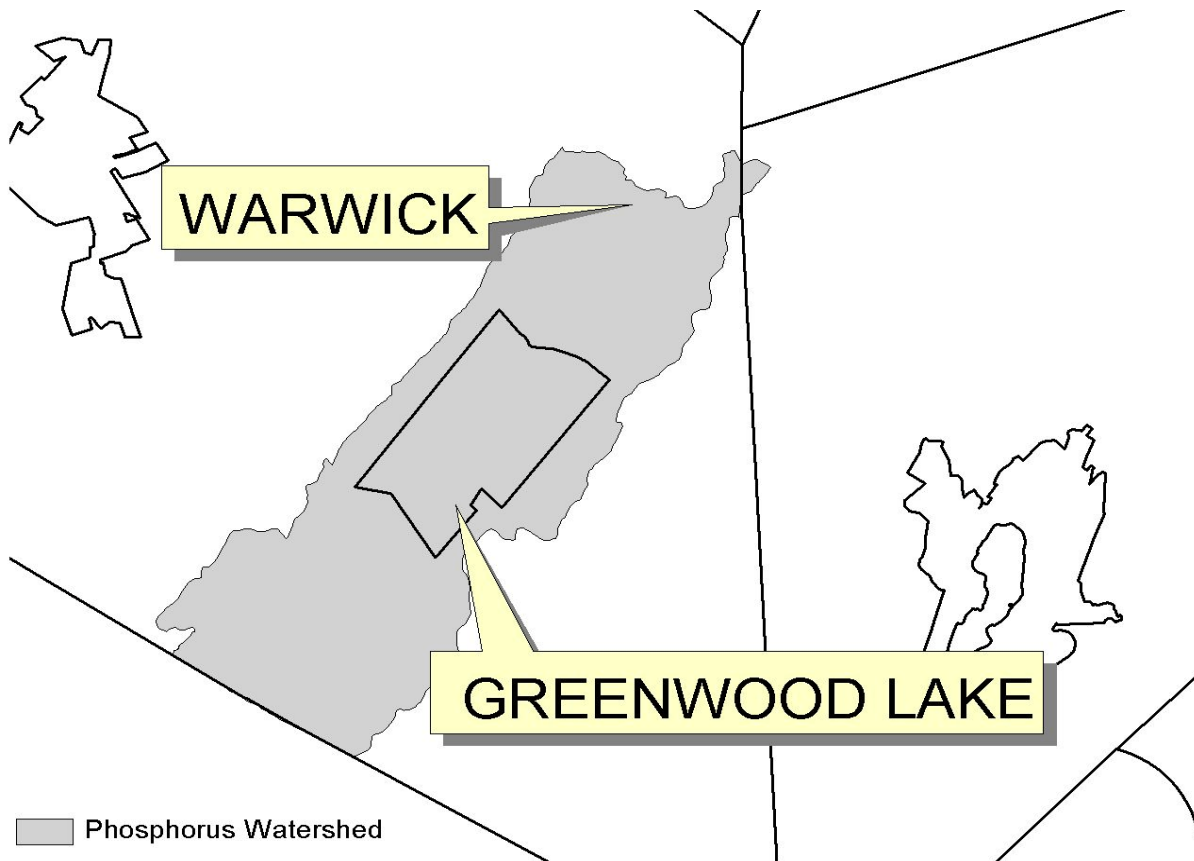


Figure 4 - Oscawana Lake Watershed

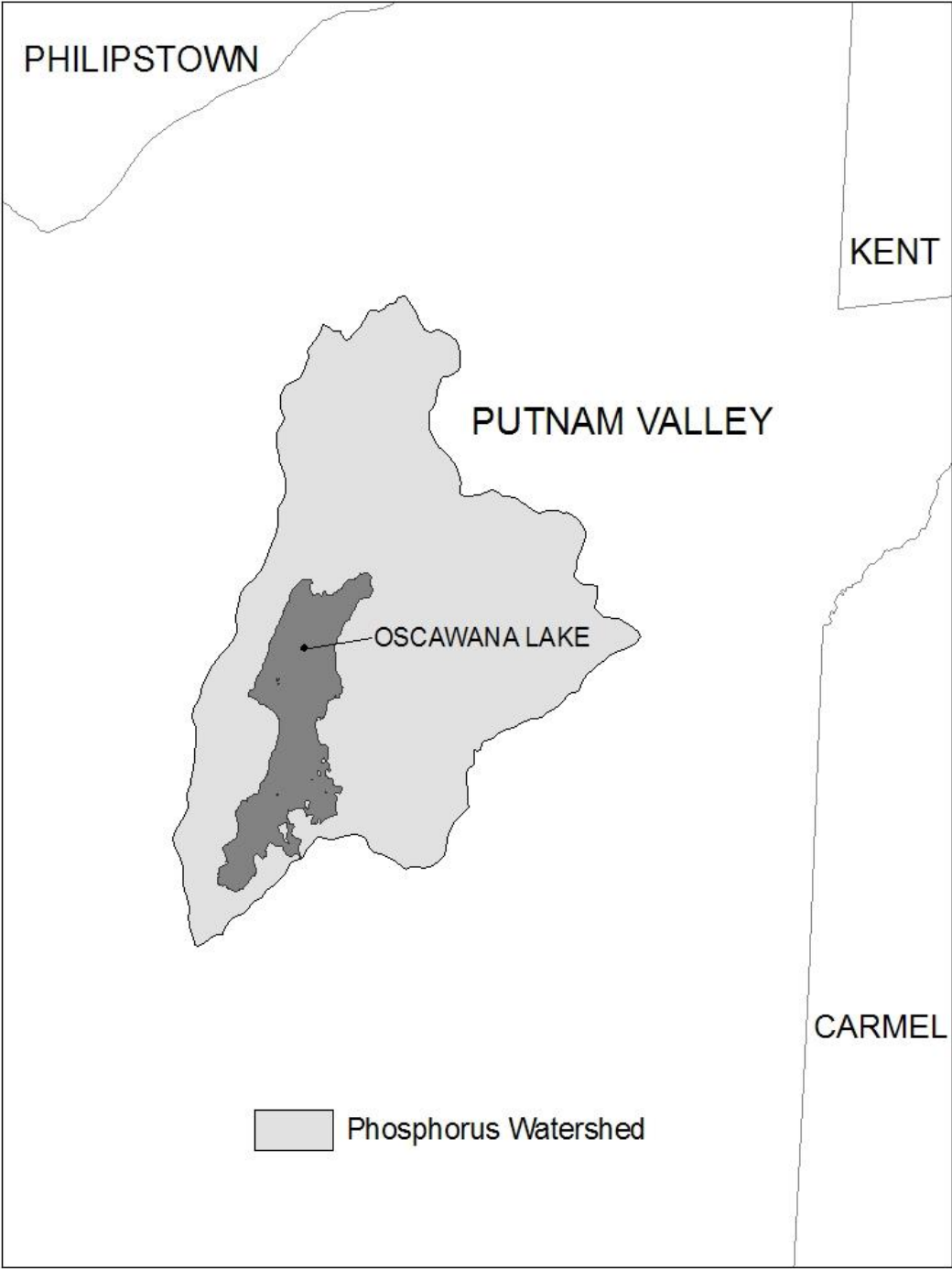
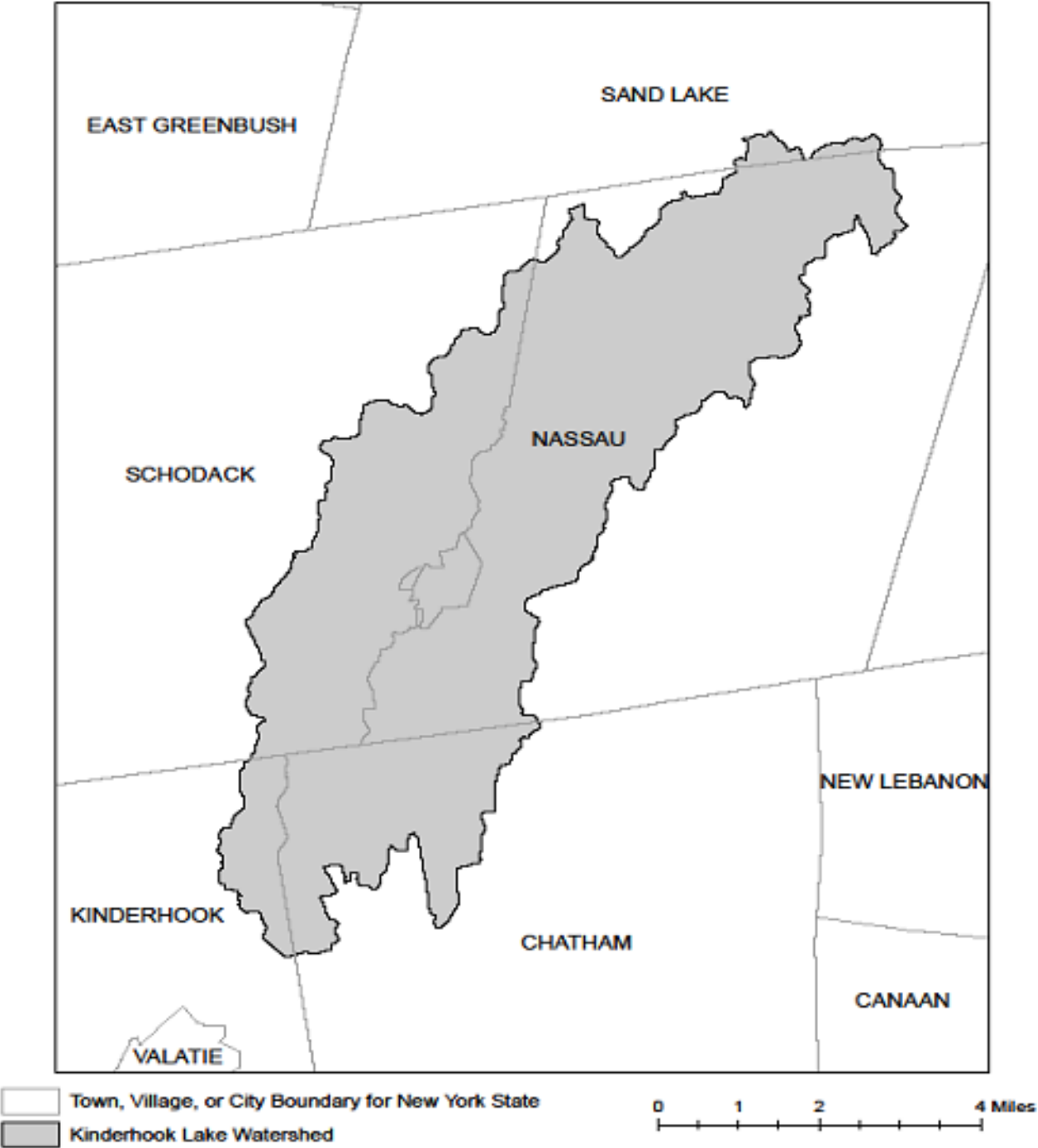


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C
--

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

<u>Region</u>	<u>COVERING THE FOLLOWING COUNTIES:</u>	<u>DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS</u>	<u>DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM</u>
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, Po Box 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

APPENDIX M

NYS DEC Notice of Intent (NOI) Form

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.40

(Submission #: HQ7-FJ38-6NxE9, version 1)

Details

Submitted	12/20/2024 (0 days ago) by Elena Gutierrez
Alternate Identifier	2731 West 12th Street
Submission ID	HQ7-FJ38-6NxE9
Submission Reason	New
Status	Submitted
Active Steps	Under Review

Form Input

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
Prologis

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Sutton

Owner/Operator Contact Person First Name
Sheila

Owner/Operator Mailing Address
1 Meadowlands Plaza, Suite 100

City
East Rutherford

State
New Jersey

Zip
07073

Phone
6105302870

Email
ssutton@prologis.com

Federal Tax ID
94-3285362

If the owner/operator is an organization, provide the Federal Tax ID number, or Employer Identification Number (EIN), in the format xx-xxxxxx. If the owner/operator is an individual and not an organization, enter "Not Applicable" or "N/A" and do not provide the individual's social security number.

Project Location

Project/Site Name

2731 West 12th Street

Street Address (Not P.O. Box)

2731 West 12th Street

Side of Street

North

City/Town/Village (THAT ISSUES BUILDING PERMIT)

Brooklyn

State





NY

Zip

11224

DEC Region

2

The DEC Region must be provided. Please use the NYSDEC Stormwater Interactive Map (<https://giservices.dec.ny.gov/gis/stormwater/>) to confirm which DEC Region this site is located in. To view the DEC Regions, click on  Other Useful Reference Layers  on the left side of the map, then click on  DEC Administrative Boundary  Zoom out as needed to see the Region boundaries.

For projects that span multiple Regions, please select a primary Region and then provide the additional Regions as a note in Question 39.

County

KINGS

Name of Nearest Cross Street

Shell Road

Distance to Nearest Cross Street (Feet)

NONE PROVIDED

Project In Relation to Cross Street



NONE PROVIDED

Tax Map Numbers Section-Block-Parcel

3072470106

Tax Map Numbers

NONE PROVIDED

If the project does not have tax map numbers (e.g. linear projects), enter  Not Applicable  or "N/A".

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are:

- Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates.
- The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates

40.58172084927663,-73.97854961181122

Project Details

2. What is the nature of this project?

Redevelopment with increase in impervious area

For the purposes of this eNOI, **New Construction** refers to any project that does not involve the disturbance of existing impervious area (i.e. 0 acres). If existing impervious area will be disturbed on the project site, it is considered redevelopment with either increase in impervious area or no increase in impervious area.

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse

Industrial

Post-Development Future Land Use

Parking Lot

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots.

NONE PROVIDED

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage) within the disturbed area.

*** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres)

16.8

Total Area to be Disturbed (acres)

13.2

Existing Impervious Area to be Disturbed (acres)

0.0

Future Impervious Area Within Disturbed Area (acres)

10.7

5. Do you plan to disturb more than 5 acres of soil at any one time?

Yes

6. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%)

0

B (%)

0

C (%)

0

D (%)

100

7. Is this a phased project?

No

8. Enter the planned start and end dates of the disturbance activities.

Start Date

04/01/2025

End Date

12/01/2025

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Coney Island Creek

Drainage ditches and storm sewer systems are not considered surface waterbodies. Please identify the surface waterbody that they discharge to. If the nearest surface waterbody is unnamed, provide a description of the waterbody, such as, ♦ Unnamed tributary to Niagara River. ♦

9a. Type of waterbody identified in question 9?

Stream/Creek Off Site

Other Waterbody Type Off Site Description

NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?

NONE PROVIDED

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001?

No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001?

No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?

No

Please use the DEC Stormwater Interactive Map (<https://gisservices.dec.ny.gov/gis/stormwater/>) to confirm if this site is located in one of the watersheds of an AA or AA-S classified water. To view the watershed areas, click on ♦ Permit Related Layers ♦ on the left side of the map, then click on ♦ Class AA AAS Watersheds. ♦

If No, skip question 13.**13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as D (provided the map unit name is inclusive of slopes greater than 25%), E or F on the USDA Soil Survey?**

No

If Yes, what is the acreage to be disturbed?

NONE PROVIDED

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?

Yes

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?

No

16. What is the name of the municipality/entity that owns the separate storm sewer system?

NONE PROVIDED

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?

No

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?

No

19. Is this property owned by a state authority, state agency, federal government or local government?

No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.)

No

Required SWPPP Components

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?

Yes

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)?

Yes

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the 2015 or 2024 NYS Stormwater Management Design Manual?

Yes

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

Professional Engineer (P.E.)

SWPPP Preparer

Langan Eng, Env, Surveying, L.A.& Geo, DPC

Contact Name (Last, First)

O'Connor, Michele

Mailing Address

368 Ninth Street, 8th Floor

City

New York

State

New York

Zip

10001

Phone

212-479-5439

Email

moconnor@langan.com

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form:

- 1) Click on the link below to download a blank certification form
- 2) The certified SWPPP preparer should sign this form
- 3) Scan the signed form
- 4) Upload the scanned document

[Download SWPPP Preparer Certification Form](#)

Please upload the SWPPP Preparer Certification

PreparerSWPPPCertFlattened_S+S.pdf - 12/20/2024 11:47 AM

Comment

NONE PROVIDED

Erosion & Sediment Control Criteria

25. Has a construction sequence schedule for the planned management practices been prepared?

Yes

26. Select all of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

Dust Control
Silt Fence
Stabilized Construction Entrance
Storm Drain Inlet Protection
Turbidity Curtain

Biotechnical

None

Vegetative Measures

Protecting Vegetation
Seeding

Permanent Structural

Rock Outlet Protection

Other

NONE PROVIDED

Post-Construction Criteria

*** IMPORTANT: Completion of Questions 27-39 is not required if response to Question 22 is No.**

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

Parking Reduction

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual.

All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)

1.26

29. Post-construction SMP Identification

Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28).

Identify the SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use the Post-Construction SMP Identification section to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)

0.34

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?

No

If Yes, go to question 36. If No, go to question 32.

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)

0.25

32a. Is the Total RRV provided (#30) greater than or equal to the Minimum RRV Required (#32)?

Yes

If Yes, go to question 33.

Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. SMPs

Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRV Provided in #30).

Also, provide the total impervious area that contributes runoff to each practice selected.

NOTE: Use the Post-construction SMP Identification section to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRV Capacity identified in question #29. (acre-feet)

1.65

Note: For the standard SMPs with RRV capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRV provided (#30) and the WQv provided (#33a).

1.99

35. Is the sum of the RRV provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?

Yes

If Yes, go to question 36.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv required and provided or select waiver (#36a), if applicable.

CPv Required (acre-feet)

NONE PROVIDED

CPv Provided (acre-feet)

NONE PROVIDED

36a. The need to provide channel protection has been waived because:

Site discharges directly to tidal waters or a fifth order or larger stream.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (#37a), if applicable.

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)

NONE PROVIDED

Post-Development (CFS)

NONE PROVIDED

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)

NONE PROVIDED

Post-Development (CFS)

NONE PROVIDED

37a. The need to meet the Qp and Qf criteria has been waived because:

Site discharges directly to tidal waters or a fifth order or larger stream.

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?

Yes

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Owner

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.

NONE PROVIDED

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs

Identify the Post-construction SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)

NONE PROVIDED

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)

NONE PROVIDED

Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)

NONE PROVIDED

Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)

NONE PROVIDED

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)

NONE PROVIDED

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)

NONE PROVIDED

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)

NONE PROVIDED

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)

NONE PROVIDED

Total Contributing Impervious Acres for Vegetated Swale (RR-5)

NONE PROVIDED

Total Contributing Impervious Acres for Rain Garden (RR-6)

NONE PROVIDED

Total Contributing Impervious Acres for Stormwater Planter (RR-7)

NONE PROVIDED

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)

NONE PROVIDED

Total Contributing Impervious Acres for Porous Pavement (RR-9)

NONE PROVIDED

Total Contributing Impervious Acres for Green Roof (RR-10)

NONE PROVIDED

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)

NONE PROVIDED

Total Contributing Impervious Acres for Infiltration Basin (I-2)

NONE PROVIDED

Total Contributing Impervious Acres for Dry Well (I-3)

NONE PROVIDED

Total Contributing Impervious Acres for Underground Infiltration System (I-4)

NONE PROVIDED

Total Contributing Impervious Acres for Bioretention (F-5)

4.53

Total Contributing Impervious Acres for Dry Swale (O-1)

NONE PROVIDED

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)

NONE PROVIDED

Total Contributing Impervious Acres for Wet Pond (P-2)

NONE PROVIDED

Total Contributing Impervious Acres for Wet Extended Detention (P-3)

NONE PROVIDED

Total Contributing Impervious Acres for Multiple Pond System (P-4)

NONE PROVIDED

Total Contributing Impervious Acres for Pocket Pond (P-5)

NONE PROVIDED

Total Contributing Impervious Acres for Surface Sand Filter (F-1)

NONE PROVIDED

Total Contributing Impervious Acres for Underground Sand Filter (F-2)

NONE PROVIDED

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)

NONE PROVIDED

Total Contributing Impervious Acres for Organic Filter (F-4)

NONE PROVIDED

Total Contributing Impervious Acres for Shallow Wetland (W-1)

NONE PROVIDED

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)

NONE PROVIDED

Total Contributing Impervious Acres for Pond/Wetland System (W-3)

NONE PROVIDED

Total Contributing Impervious Acres for Pocket Wetland (W-4)

NONE PROVIDED

Total Contributing Impervious Acres for Wet Swale (O-2)

NONE PROVIDED

Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Total Contributing Impervious Area for Hydrodynamic

6.82

Total Contributing Impervious Area for Wet Vault

NONE PROVIDED

Total Contributing Impervious Area for Media Filter

NONE PROVIDED

"Other" Alternative SMP?

NONE PROVIDED

Total Contributing Impervious Area for "Other"

NONE PROVIDED

Provide the name and manufacturer of the alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

Manufacturer of Alternative SMP

NONE PROVIDED

Name of Alternative SMP

NONE PROVIDED

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility.

Tidal Wetlands

If SPDES Multi-Sector GP, then give permit ID

NONE PROVIDED

If Other, then identify

NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit?

No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth

NONE PROVIDED

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.

NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4?

No

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?

NONE PROVIDED

MS4 SWPPP Acceptance Form Download

Download form from the link below. Complete, sign, and upload.

[MS4 SWPPP Acceptance Form](#)

MS4 Acceptance Form Upload

NONE PROVIDED

Comment

NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.

[Owner/Operator Certification Form \(PDF, 45KB\)](#)

Upload Owner/Operator Certification Form

constnoioocert_signed.pdf - 11/20/2024 04:56 PM

Comment

NONE PROVIDED

Attachments

Date	Attachment Name	Context	User
12/20/2024 11:47 AM	PreparerSWPPPCertFlattened_S+S.pdf	Attachment	Elena Gutierrez
11/20/2024 4:56 PM	constnoioocert_signed.pdf	Attachment	Elena Gutierrez

Status History

	User	Processing Status
10/18/2024 12:20:43 PM	Elena Gutierrez	Draft
12/20/2024 12:13:10 PM	Elena Gutierrez	Submitting
12/20/2024 12:13:23 PM	Elena Gutierrez	Submitted

Processing Steps

Step Name	Assigned To/Completed By	Date Completed
Form Submitted	Elena Gutierrez	12/20/2024 12:13:23 PM
Under Review	Daniel von Schilgen	

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Water Permits

625 Broadway, Albany, New York 12233-3505

P: (518) 402-8111 F: (518) 402-9029

www.dec.ny.gov

1/10/2025

Prologis

Sheila Sutton

1 Meadowlands Plaza, Suite 100

East Rutherford, New Jersey 07073

**RE: ACKNOWLEDGMENT of NOTICE OF INTENT for
Coverage Under SPDES General Permit for
Storm Water Discharges from CONSTRUCTION
ACTIVITY – General Permit No. GP-0-20-001**

Dear Prospective Permittee:

This is to acknowledge that the New York State Department of Environmental Conservation (Department) has received a complete Notice of Intent (NOI) for coverage under General Permit No. GP-0-20-001 for the construction activities located at:

2731 West 12th Street

2731 West 12th Street

Brooklyn, NY 11224

County: **KINGS**

Pursuant to Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, and ECL Article 70, coverage under GP-0-20-001 for the above construction site is effective five (5) business days from **12/20/2024**, which is the date the Department received your complete eNOI.

The permit identification number for this site is: **NYR11N628**. Be sure to include this permit identification number on any forms or correspondence you send the Department. When coverage under GP-0-20-001 is no longer needed, you must submit a Notice of Termination to the Department.

Additionally, authorization to discharge under GP-0-20-001 is conditioned upon compliance with Part II.C. of GP-0-20-001, specifically the following:

1. A final Storm Water Pollution Prevention Plan has been prepared;
2. When applicable, project review pursuant to the State Environmental Quality Review Act (SEQRA) has been satisfied;
3. Where required, all necessary Department permits subject to the Uniform Procedures Act (UPA) (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4).



Department of
Environmental
Conservation

If other UPA permits, or the equivalent, are required, you must submit a preliminary SWPPP to the appropriate Permit Administrator at the Regional Office listed in Appendix F to GP-0-20-001. The preliminary SWPPP must be submitted at the time that the applications for all other UPA permits, or the equivalent, are submitted to the Department.

Note: Construction cannot commence until all of the above have been satisfied.

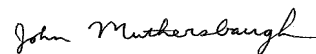
Please be advised that before disturbing greater than 5 acres of soil at any one time, you have obtained approval from our Regional Office. You should contact the Regional Office listed below.

Selvin Southwell
NYS Department of Environmental Conservation - Region: 2
One Hunters Point Plaza, 47-40 21st Street
Long Island City, NY 11101-5407

Please also be advised that there is an annual regulatory fee of \$110, which is billed by the Department in the late fall. The regulatory fee covers a period of one calendar year. In addition, since September 1, 2004, construction stormwater permittees have been assessed an initial authorization fee which is now \$110 per acre of land disturbed and \$675 per acre of future impervious area. The initial authorization fee covers the duration of the authorized disturbance.

Should you have any questions regarding any aspect of the requirements specified in GP-0-20-001, please contact me at (518) 402-8188.

Sincerely,

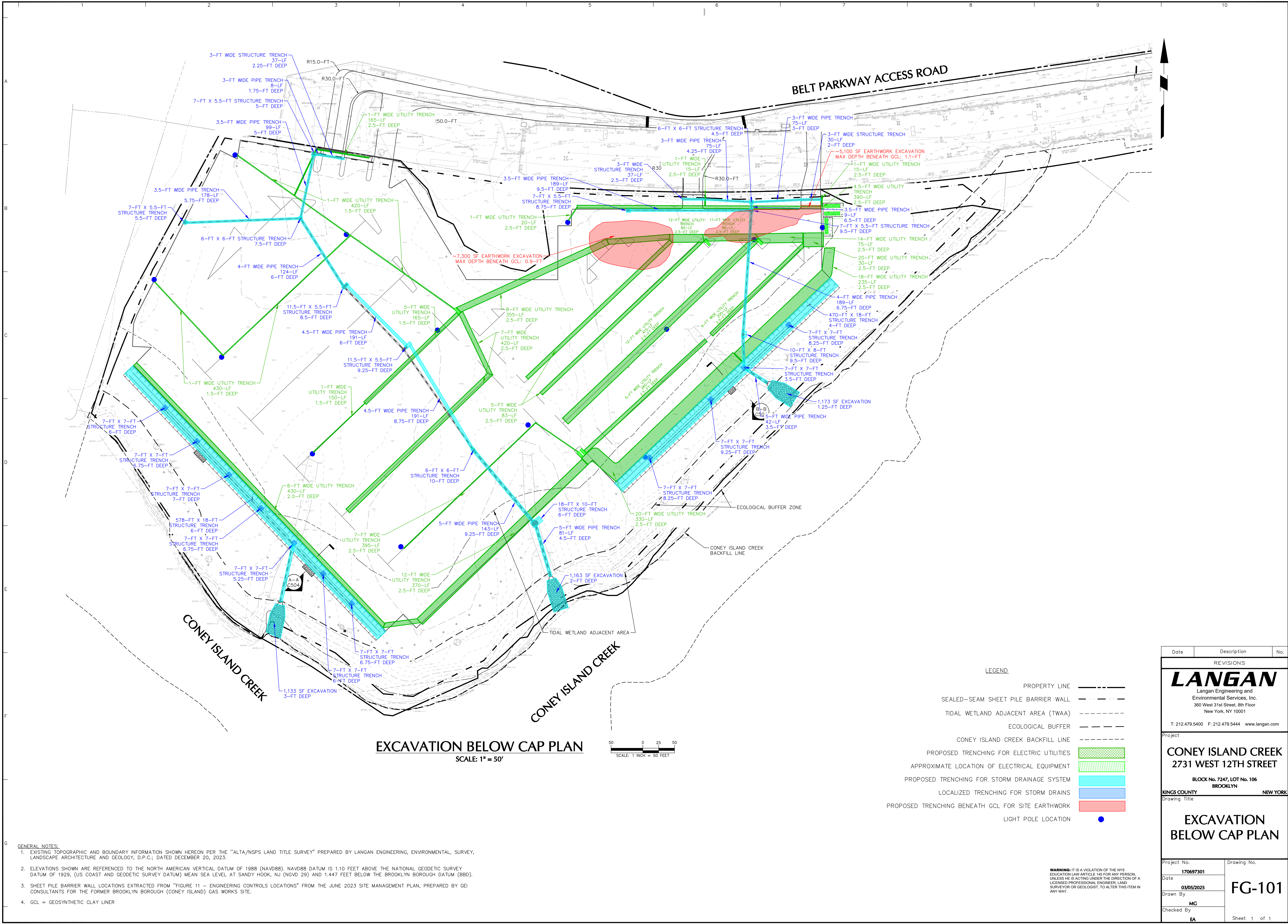


**John Muthersbaugh
Assistant Engineer**

cc: RWE - 2
SWPPP Preparer
Langan Eng, Env, Surveying, L.A.& Geo, DPC
O'Connor, Michele
368 Ninth Street, 8th Floor
New York, New York 10001

ATTACHMENT 7

PROPOSED EXCAVATION EXTENTS



EXCAVATION BELOW CAP PLAN
SCALE: 1" = 50'

- GENERAL NOTES:
- EXISTING TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON PER THE "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C.; DATED DECEMBER 20, 2023.
 - ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). NAVD88 DATUM IS 1.10 FEET ABOVE THE NATIONAL GEODETIC SURVEY DATUM OF 1929, (US COAST AND GEODETIC SURVEY DATUM) MEAN SEA LEVEL AT SANDY HOOK, NJ (NGVD 29) AND 1.447 FEET BELOW THE BROOKLYN BOROUGH DATUM (BBD).
 - SHEET PILE BARRIER WALL LOCATIONS EXTRACTED FROM "FIGURE 11 - ENGINEERING CONTROLS LOCATIONS" FROM THE JUNE 2023 SITE MANAGEMENT PLAN, PREPARED BY GEI CONSULTANTS FOR THE FORMER BROOKLYN BOROUGH (CONEY ISLAND) GAS WORKS SITE.
 - GCL = GEOSYNTHETIC CLAY LINER

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 148 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

- LEGEND
- PROPERTY LINE
 - SEALED-SEAM SHEET PILE BARRIER WALL
 - TIDAL WETLAND ADJACENT AREA (TWAA)
 - ECOLOGICAL BUFFER
 - CONEY ISLAND CREEK BACKFILL LINE
 - PROPOSED TRENCHING FOR ELECTRIC UTILITIES
 - APPROXIMATE LOCATION OF ELECTRICAL EQUIPMENT
 - PROPOSED TRENCHING FOR STORM DRAINAGE SYSTEM
 - LOCALIZED TRENCHING FOR STORM DRAINS
 - PROPOSED TRENCHING BENEATH GCL FOR SITE EARTHWORK
 - LIGHT POLE LOCATION

Date	Description	No.
REVISIONS		
<div>LANGAN</div> <div>Langan Engineering and Environmental Services, Inc. 360 West 31st Street, 8th Floor New York, NY 10001</div> <div>T: 212.479.5400 F: 212.479.5444 www.langan.com</div>		
Project		
<div>CONEY ISLAND CREEK</div> <div>2731 WEST 12TH STREET</div> <div>BLOCK No. 7247, LOT No. 106</div> <div>BROOKLYN</div> <div>KINGS COUNTYNEW YORK</div>		
Drawing Title		
<div>EXCAVATION</div> <div>BELOW CAP PLAN</div>		
Project No.		Drawing No.
170697301		FG-101
Date		
03/05/2025		
Drawn By		
MG		
Checked By		Sheet 1 of 1
EA		

ATTACHMENT 8

NATIONAL GRID-APPROVED DISPOSAL FACILITIES

NATIONAL GRID

ENVIRONMENTALLY APPROVED WASTE DISPOSAL FACILITIES

AS OF MAY 2, 2023

(NOTE: FACILITIES ARE APPROVED TO RECEIVE SPECIFIC PERMITTED WASTES. THE RECOMMENDED WASTE STREAMS COLUMN IS NOT ALL INCLUSIVE. PLEASE CONSULT WITH ENVIRONMENTAL PROIR TO DISPOSING OF WASTES)

VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
ACV Enviro	Non-RCRA, Non-PCB waste including lab pack waste, petroleum contaminated solids & liquids	550 Industrial Drive Lewisberry, PA 17339	Pennsylvania	(717) 938-4700	PAD067098822	3/18/2020	1/29/2019	CHWMEG audit
ACV Enviro	Permitted RCRA & Non-RCRA Wastes including PCBs	217 S. First Street Elizabeth, NJ 07206	New Jersey	(908) 355-5800	NJD002200046	6/14/2022	3/16/2022	CHWMEG & On-site Audit
American Lamp Recycling, LLC	Universal Wastes/ Lamps/Bulbs/Mercury Regulators and equipment E-Waste, Electrical Ballasts	55 Riverview Drive Marlboro, NY 12542	New York	(800) 315-6262	NYR000192005	3/17/2021	8/13/2020	CHWMEG audit
American Recyclers Company (ARC)	Non-RCRA, Non-PCB waste including waste oils, oily water, petroleum contaminated solids	177 Wales Avenue Tonawanda, NY 14150	New York	(716) 695-6720	NYD986903904	3/18/2020	3/1/2020	On-site audit
Bayshore Soil Mgt. (ESMI of NJ)	Non-Haz. Petroleum Contaminated Soils Coal Tar Contaminated Soils	75 Crows Mill Road Keasbey, NJ 08832	New Jersey	(732) 738-6000		3/13/2019	7/11/2018	CHWMEG audit
Charter-Lynn Landfill Company, LLC	Soils meeting the requirements for unlined landfills of MA’s DEP Policy COMM-97-001	Hanson Street Lynn, MA 01905	Massachusetts	(671) 594-4054		N/A	12/6/2021	On-site audit
Chemical Waste Management (Waste Management Inc.)	All Facility Permitted Waste Streams	Highway 17 North Emelle, AL 35459	Alabama	(205) 652-8086	ALD000622464	6/13/2018	6/13/2018	On-site audit
Chemical Waste Management*	Haz. and Non-Haz. Wastes Asbestos Waste TSCA Waste	1550 Balmer Road Model City, NY 14107	New York	(716) 754-8231	NYD049836679	9/21/2016	8/15/2013	CHWMEG audit
CID (Chafee) Landfill, Inc.	Asbestos Waste	10860 Olean Road Chaffee, NY 14030	New York	(716) 496-5514	NYD000517458	N/A	N/A	Low Risk. No Further Audits
City of Albany Landfill	Petroleum Contaminated Soils, Constrction and Demolition Debris Solid Waste	525 Rapp Road Albany, NY 12202	New York	(518) 869-3651	N/A	N/A	N/A	Low Risk. No Further Audits
Fulton County Landfill	Petroleum Contaminated Soils, Constrction and Demolition Debris Solid Waste	47 Mud Rd. Johnstown, NY 12095	New York	(518) 736-5501	N/A	N/A	N/A	Low Risk. No Further Audits
Clean Earth Connecticut	Non-Haz. Petroleum Contaminated Soils Coal Tar Contaminated Soils	58 North Washington Street Plainville, CT 06062	Connecticut	(860) 747-8888		6/28/2017	5/16/2017	On-site audit
Clean Earth of Carteret Inc.	Petroleum Contaminated Soils Urban Fills	24 Middlesex Avenue Carteret, NJ 07008	New Jersey	(215) 734-1400		4/4/2018	8/8/2017	CHWMEG Audit
Clean Earth Dredging Technologies, LLC – Claremont	Non-Haz Sediments	1 Linden Avenue East Jersey City, NJ 07305	New Jersey	(201) 395-0040			5/4/2015	On-site audit
Clean Earth of New Castle, Inc.	Petroleum Contaminated Soils Urban Fills	94 Pyles Lane New Castle, DE 19720	Delaware	(302) 427-6633		2/1/2023	2/1/2023	CHWMEG audit
Clean Earth of North Jersey	Petroleum Contaminated Soils Urban Fills	115 Jacobus Avenue South Kearny, NJ 07032	New Jersey	(973) 344-4004	NJD991291105		2/12/2014	CHWMEG audit
Clean Earth of Philadelphia	Petroleum Contaminated Soils Coal Tar Contaminated Soils for thermal desorption only	3201 South Street Philadelphia, PA 19153	Pennsylvania	(215) 724-5520		12/10/2019	5/16/2019	CHWMEG audit
Clean Earth of Southeast PA	Petroleum Contaminated Soils Coal Tar Contaminated Soils for thermal desorption only	7 Steel Road East Morrisville, PA 19067	Pennsylvania	(215) 428-1700		6/13/2018	6/13/2018	CHWMEG audit
Clean Earth Dredging Technologies, LLC – Koppers	Non-Haz Sediment	1 Fish House Road Kearney, NJ 07032	New Jersey	(201) 997-2949			5/4/2015	On-site audit
Clean Harbors- Aragonite, UT	Hazardous/non-hazardous contaminated soil, sludges, and liquids; spent activated carbon, universal waste (mercury-containing lamps and ballasts; and batteries)	11600 North Aptus Rd. Aragonite, UT	Utah	435-884-8100	UTD981552177	4/25/2023	4/24/2023	CHWMEG audit
Clean Harbors – Cleveland	Wastewater Treatment	2900 Broadway Cleveland, OH 44115	Ohio	(216) 429-2401	OHD000724153	3/16/2021	8/20/2020	CHWMEG audit
Clean Harbors – Kimball	Coal Tar Soils Incineration	HC54 Box 28 Kimball, NE 69145	Nebraska	(308) 235-4012	NED981723513	3/13/2019	6/12/2018	CHWMEG Audit
Clean Harbors – Portland, ME	Waste Oil Non-Haz. WWT	37 Rumery Road South Portland, ME 04106	Maine	(207) 799-8111	MED980672182	9/13/2017	9/13/2017	On-site audit
Clean Harbors – Deer Park (Rollins Environmental Services)	Haz. Waste Incineration per Facility Permits	2027 Battleground Road Deer Park, TX 77536	Texas	(281) 930-2300	TXD055141378	3/13/2019	5/5/2018	CHWMEG Audit

NATIONAL GRID
ENVIRONMENTALLY APPROVED WASTE DISPOSAL FACILITIES
AS OF MAY 2, 2023

(NOTE: FACILITIES ARE APPROVED TO RECEIVE SPECIFIC PERMITTED WASTES. THE RECOMMENDED WASTE STREAMS COLUMN IS NOT ALL INCLUSIVE. PLEASE CONSULT WITH ENVIRONMENTAL PROIR TO DISPOSING OF WASTES)

VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Clean Harbors Env. Services, Inc.	Incineration of Hazardous Waste Streams	309 American Circle El Dorado, AR 71730	Arkansas	(870) 864-3711	ARD069748192	9/25/2019	6/4/2019	CHWMEG Audit
Clean Harbors (Grassy Mountain)	Landfill –TSCA,RCRA Asbestos Waste	Grayback Hills Drive Knolls, UT 84083	Utah	(801) 323-8900	UTD991301748	3/16/2021	12/30/2020	CHWMEG audit
Clean Harbors of Baltimore	Industrial Wastewater	1910 Russell Street Baltimore, MD 21230	Maryland	(410) 244 8200	MDD980555189	9/26/2018	5/23/2018	CHWMEG audit
Clean Harbors of Braintree	Various Waste Streams per Facility Permits	1 Hill Avenue Braintree, MA 02184	Massachusetts	(781) 849-1807	MAD053452637	3/13/2019	4/13/2018	On-site audit
Clean Harbors of Connecticut	Non-Hazardous Solids Wastewater Treatment	51 Broderick Road Bristol, CT 06010	Connecticut	(860) 583-8917	CTD000604488	6/17/2020	9/18/2019	CHWMEG audit
Clean Water of New York	Waste Oils Waste Waters	3249 Richmond Terrace P.O. Box 030312 Staten Island, NY 10303	New York	(718) 981-4600		10/26/2022	10/19/2020	On-site audit
Colonie Landfill	Petroleum Contaminated Soils, Constrcution and Demolition Debris Solid Waste	Memorial Town Hall Newtonville, NY 12128	New York	(518) 783-2827		N/A	N/A	Low Risk. No Further Audits
Complete Recycling Solutions, LLC	Mercury containing wastes Lighting ballasts and small capacitors (both PCB and non-PCB) Electronic waste	1075 Airport Road Fall River, MA 02720	Massachusetts	(508) 402-7700	MAD980915755		6/13/2018	On-site audit
County of Franklin Solid Waste Management Authority	Petroleum Contaminated Soils Solid Waste/C&D	828 County Route 20 Constable, NY 12926	New York	(518) 483-8270	NYN008021891		8/1/2008	On-site audit
Covanta Environmental Solutions - Agawam	Treated Wood ,Utility Poles	188 M Street Agawam, MA 01001	Massachusetts	(413) 785-5120			6/2/2015	On-site Audit
Covanta Environmental Solutions - Niagara (Green Environmental)	Nonhazardous sludge's, Solids and liquids	8335 Quarry Road Niagara Falls, NY 14304	New York	(716) 298-5297		9/21/2016	1/25/2016	CHWMEG Audit
Covanta Environmental Solutions - Oriskany (Industrial Oil Tank)	Oily Water, Non-haz solids	120 Dry Road Oriskany, NY13424	New York	(315) 736-6080	NYR000005298	4/5/2017	7/1/2020	CHWMEG Audit
Covanta Environmental Solutions - Hempstead (Hempstead Resource Recovery)	Non Hazardous Incinerator	600 Merchants Concourse Westbury, NY 11590	New York	(516) 683-5438	NYD980215511		9/15/2009	On-site audit Low Risk. No Further Audits
Covanta Environmental Solutions - Oriskany (Industrial Oil Tank)	MGP Remediation Soils Non-Hazardous Solids (Oil-impacted spill debris)	100 Energy Blvd at 56th St. Niagara Falls, NY 14304	New York	(716) 278-8500	NYD986930543	4/5/2017	1/25/2016	CHWMEG audit
Development Authority of the North Country (DANC) (Rodman Landfill)	Coal Tar/Petroleum Contaminated Soils/C&D	NYS Route 177 Rodman, NY 13682	New York	(315) 785-2593			6/19/2013	On-site audit
Doe Run Company (Buick Resource Recycling)	Lead Battery Recycling	18594 Highway KK Boss, MO 65440	Missouri	(573) 244-5261	MOD059200089	Pending	5/4/2016	CHWMEG audit
Emerald Transformer (Clean Harbors PCB Serv.)	TSCA Waste Materials	1672 East Highland Twinsburg, OH 44087	Ohio	(330) 425-3825	OHD986975399	11/13/2015	5/8/2014	CHWMEG audit
Emerald Transformer (Clean Harbors PPM)	TSCA/Non-TSCA Transformers and Oils	2474 Hwy 169 North Coffeyville, KS 67337	Kansas	(620) 251-6380	KSD981506025	6/28/2017	8/10/2016	CHWMEG audit
EnerSys (GS YUASA)	Battery Recycling (Transfer)	16 Celina Ave. Nashua, NH 03060	New Hampshire	(800) 343-5526		6/13/2018	6/13/2018	Desk Top Audit
Environmental Products & Services of Vermont	Transfer Station to approved facilities only	532 State Fair Blvd Syracuse, NY 13204	New York	(315) 451-6666	NYR000115733	6/28/2017	7/11/2016	CHWMEG audit
Environmental Soil Management, Inc. (ESMI - NY) (Clean Earth)	Coal Tar Contaminated Soils Oily Soils/Urban Fill - minimal PCBs per approval.	304 Towpath Road Fort Edward, NY 12828	New York	(518) 747-5500		4/26/2023	4/20/2023	CHWMEG audit

NATIONAL GRID
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VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Environmental Soil Management, Inc. (ESMI - Loudon) (Clean Earth)	Coal Tar Contaminated Soils Oily Soils, Urban Fill	67 International Drive Loudon, NH 03301	New Hampshire	(603) 783-0228	NH5986485852	12/10/2019	7/30/2019	CHWMEG audit
Evoqua	Carbon Recycling	118 Park Road, Darlington, PA 16115	Pennsylvania	(724) 827-8181	PAD987270725	12/12/2018	7/10/2018	CHWMEG audit
Global Cycle	Non-hazardous waste water treatment (including excavation, decon, and purge water etc.) Specific Facility Acceptance Criteria/Contaminant Concentrations Apply	700 Richmond Street Taunton, MA 02718	Massachusetts	(508) 828-1005		9/13/2017	9/13/2017	On-site audit
G&S Technologies	Non-TSCA Equipment	1800 Harrison Ave. Kearny, NJ 07032	New Jersey	(201) 998-9244	NJD011370525	2/1/2023	2/1/2023	CHWMEG Audit
High Acres Landfill (Waste Managment)	Non-Haz Waste	425 Perinton Parkway Fairport, NY 14450	New York	(716) 223-6132			12/15/2006	On-site audit
Hydrotec North America LLC	Non-Haz and Hazardous Oils for re-refining	2021 Steinway Blvd S.E Canton OH 44707	Ohio	1 (330) 454 8202	OHR000143263	4/4/2018	8/18/2015	CHWMEG audit
Interstate Battery of Greator Albany	Battery Recycling	2 Interstate Ave Albany, New York 12205	New York	(518) 438 - 2288		2/1/2023	1/31/2023	On-site audit
Lakeview Landfill (Waste Managment)	Asbestos Waste	851 Robinson Road East Erie, PA 16509	Pennsylvania	(814) 825-8588				Low Risk. No Further Audits
Lehigh Cement (ESSROC)	Liquids/Sludge's	3084 West County Road 225 South Logansport, Indiana 46947	Indiana	(574) 753-5121	IND005081542	4/30/2019	8/30/2018	CHWMEG audit
Lewis County Solid Waste Department	Solid Waste	Trinity Avenue Lowville, NY 13367	New York	(315) 376-5394				Low Risk. No Further Audits
Metalico Aluminum Recovery (Syracuse)	Intact Lead Acid Batteries	6225 Thompson Road Syracuse, NY 13201	New York	(315) 414-6493	NYD006977086	11/21/2021	11/11/2021	On-site audit
Metalico Aluminum Recovery (Buffalo)	Intact Lead Acid Batteries	127 Filmore Ave Buffalo, NY 14310	New York	716-823-3788	NYR000157974	10/26/2022	10/20/2022	On-site audit
Minerva Enterprises	Asbestos Waste	8955 Minerva Road SE Waynesburg, OH 46888	Ohio	(330)866-3435		2/1/2023	2/1/2023	CHWMEG audit
Modern Disposal	Solid Waste	4746 Model City Road Model City, NY 14107	New York	(716) 754-8226	NY0986921237	N/A	N/A	On-site audit
Montgomery County (MOSA)	Solid Waste	P.O. Box 160, Route 7 Howes Cave, NY 12092	New York	(518) 296-8884		N/A	N/A	
Murphy's Waste Oil (Clean Harbors)	Waste Oil Oil Filter Recycling	252 Salem Street Woburn, MA 01801	Massachusetts	(781) 935-9066	MAD066588005	3/19/2020	6/13/2019	CHWMEG audit
Ondrick Material and Recycling, LLC	Petroleum Contaminated Soil for Reclamation Reuse	22 Industry Road Chicopee, MA 01020	Massachusetts	(413) 592-2566		3/27/2023	4/27/2023	On-site audit
Oneida - Herkimer County Landfill	Solid Waste	7044 State Route 294 Boonville, NY 13309	New York	(315) 733-1224				Low Risk. No Further Audits
Ontario County Sanitary Landfill	Solid Waste	3555 Post Farm Road Stanley, NY 14561	New York	(585) 526-4420			8/17/2004	On-site audit
Revere Smelting & Refining Corporation	Lead Acid Battery Recycler	65 Ballard Road Middletown, NY 10941	New York	(845) 692-4414	NYD030485288	12/14/2016	11/21/2016	Desk-Top audit
Safety-Kleen Systems Inc.	Part Washer Recycling all other waste streams permitted via permits	17 Green Mountain Road Cohoes, NY 12047	New York	(518) 783-8080	NYD986872869	2/1/2023	2/1/2023	CHWMEG audit
Safety-Kleen Systems Inc.	Part Washer Recycling	80 Seabro Ave. North Amityville, NY 11701	New York	(631) 842-6311	NYD000708198	Fall 2010		Low Risk. No Further Audits
Safety-Kleen Systems, Inc.	Oil Filters, Waste Oil, Transfer Facility	167 Mill Street Cranston, RI	Rhode Island	(401) 781-0808	RID084802842	12/12/2018	4/11/2018	CHWMEG audit
Seneca Meadows Landfill (IESI)	Non-haz Waste, Asbestos Waste	1786 Saloman Road Waterloo, NY 13165	New York	(315) 539-5624			1/29/2014	On-site audit

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VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Superior Greentree Landfill (ADS Greentree)	Landfill-Non Hazardous	635 Toby Road, Kersey, PA 15846	Pennsylvania	(814) 265-1975		N/A	N/A	Low Risk. No Further Audits
Tradebe - Norlite Corporation	Used Oil Coal Tar	628 South Saratoga Street Cohoes, NY 12047	New York	(518) 235-0401	NYD080469935	9/25/2019	2/22/2019	CHWMEG Audit
Tradebe - Bridgeport (Bridgeport United Recycling)	Used Oil, Waste Waters	50 Cross Street Bridgeport, CT 06610	Connecticut	(203) 334-4812	CTD002593887	12/12/2018	6/11/2018	CHWMEG Audit
Tradebe - Meriden (United Oil Recovery Inc.)	Used Oils, Waste Waters	136 Gracey Avenue Meriden, CT 06450	Connecticut	(203) 238-6745	CTD021816889	12/12/2018	6/12/2018	CHWMEG Audit
Trans-Cycle Industries (TCI)	TSCA Transformer and Lead/PCB Cable Disposal	101 Parkway, East Pell City, AL 35125	Alabama	(205) 338-9997	ALD983167891	9/26/2018	5/11/2017	CHWMEG audit
TCI of New York	Non-TSCA Transformer Disposal Approved for Surplus only-No PILC	Coeymans Industrial Park Lane Coeymans, NY 12045	New York	(518) 828-9997	NYD986899912	6/28/2017	3/14/2016	CHWMEG audit
US Ecology - Michigan Disposal Waste Treatment (MDI)	Hazardous waste solids	49350 North I-94 Service Dr. Belleville, MI 48111	Michigan	(800) 592-5489	MID000724831	8/6/2019	9/18/2018	CHWMEG Audit
US Ecology - Wayne Disposal Inc (WDI)	Solid PCB Waste- Landfill NORM	49350 North I-94 Service Dr. Belleville, MI 48111	Michigan	(800) 592-5489	MID048090633	9/23/2018	9/18/2018	CHWMEG Audit
Veolia ES Technical Solutions – Port Arthur	Incineration: waste solvents, solvent/oil mixtures, organic and inorganic chemical wastes, pesticide wastes, petroleum wastes, aqueous wastes, contaminated soils, sludges, PCBs and capacitors	7665 Highway 73 Port Arthur, TX 77840	Texas	(409) 736-2821	TXD000838896	9/26/2018	3/29/2018	CHWMEG audit
Veolia ES Technical Solutions - Sauget	Incineration: Various Hazardous solids & liquids for treatment/incineration. PCB wastes <50ppm	7 Mobile Avenue Sauget, IL 62201	Illinois	(618) 271-2804	ILD098642424	4/25/2023	4/20/2023	On-site audit
Veolia ES Technical Solutions - West Bridgewater (Global Recycling)	Lighting ballasts Small capacitors (PCB and non-PCB) E-waste, Universal Waste	90 Pleasant St, West Bridgewater, MA 02379	Massachusetts	(774) 296-6030	MAC300017498	3/13/2019	8/12/2018	On-site audit
Veolia ES Technical Solutions Flanders	Transfer Facility	1 Eden Lane Flanders, NJ 07836	New Jersey	(973) 347-7111	NJD980536593	3/16/2021	10/12/2020	On-site audit
Veolia ES Technical Solutions - Middlesex (Marisol)	Fuels Blending	125 Factory Lane Middlesex, NJ 08846	New Jersey	(732) 469-5100	NJD002454544	3/16/2021	10/13/2020	On-site audit
Veolia ES Technical Solutions - WI	Mercury, PCB Ballasts, Universal Waste	1275 Mineral Springs Drive Port Washington, WI 53074	Wisconsin	(262) 243-8900	WID988566543	2/1/20223	2/1/2021	CHWMEG Audit
Posillico Wash Plant	Petroleum Contaminated Soils, Brick, Concrete, rock, sand and Asphalt	1610 New Highway Farmingdale, NY 11735	New York	(631) 390-5777		10/26/2022	4/18/2022	On-site
Waste Management - Fairless Landfill	Construction & Demolition Debris Non- Hazardous Contaminated Soils Friable & Non-Friable Asbestos	1513 Bordentown Road Morrisville, PA 19067	Pennsylvania	(866) 909-4458		10/9/2019	10/1/2019	CHWMEG Audit
Waste Management - Greenridge RDF	Petroleum Contaminated Soils, C&D Debris, Clean soils	424 Peters Road Ganesvoort, New York 12831	New York	(518) 636-2141		9/26/2018		Low Risk. No Further Audits
Waste Management - Mercury Waste Inc.	Mercury Waste	21211 Durand Avenue Union Grove, WI 53217	Wisconsin	(262) 878-2599	WIR000000356	12/10/2019	9/11/2019	CHWMEG Audit

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VENDOR	RECOMMENDED WASTE STREAMS	FACILITY LOCATION	STATE	PHONE	EPA ID NUMBER	DATE OF LAST APPROVAL	DATE OF LAST AUDIT	TYPE OF AUDIT
Waste Management – Turnkey	Asbestos Waste, Non- Hazardous	97 Rochester Neck Road Rochester, NH 03867	New Hampshire	(603) 332-2386		12/13/2018	8/8/2017	Desktop Audit
Waste Management Disposal Services of Maine: BDS Waste Disposal Inc.	Asbestos Waste, Non-Hazardous	357 Mercer Road Norridgewock, ME 04957	Maine	(207) 634-2714	MED98254699	3/16/2016	12/18/2015	Desktop Audit
110 Sand & Gravel	C&D Debris Soaked Coal Tar Wrap Pipe	136 Spagnoli Road, Melville, NY	New York	(631) 694-2822				Low Risk. No Further Audits

* = Site has been reported closed

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ATTACHMENT 9

REQUEST TO IMPORT/REUSE FILL OR SOIL FORM



**NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**



Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.

SECTION 1 – SITE BACKGROUND

Site Name:

Site Number:

The allowable site use is:

Have Ecological Resources been identified?

Is this soil originating from the site?

How many cubic yards of soil will be imported/reused?

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone?

Does it contain less than 10%, by weight, material that passes a size 100 sieve?

Is this virgin material from a permitted mine or quarry?

Is this material recycled concrete or brick from a DEC registered processing facility?

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Name and address of fill source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

--

The information provided on this form is accurate and complete.

Signature

Date

Print Name

Firm

ATTACHMENT 10

CHASP

CONSTRUCTION HEALTH AND SAFETY PLAN

FOR

**2731 WEST 12TH STREET
CONEY ISLAND
BROOKLYN, NEW YORK
Brooklyn Borough/Kings County Tax Map
Block 7247, Lot 106**

Prepared for

**2731 W 12th Street LLC
1800 Wazee Street, Suite 500
Denver, Colorado**

Prepared by:

**Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology
369 Ninth Avenue, 8th Floor
New York, New York 10001**

LANGAN

**June 2024
Langan Project No. 170697301**

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* Items to be posted prominently on-site or made readily available to personnel.

1.0 INTRODUCTION

1.1 General

This CONSTRUCTION HEALTH AND SAFETY PLAN (CHASP) was developed to address disturbance of known and reasonably anticipated subsurface contaminants and comply with Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulation (CFR) 1910.120(b)(4), Hazardous Waste Operations and Emergency Response during anticipated site for the property located at 2731 West 12th Street located in the Coney Island neighborhood of Brooklyn, New York (hereafter referred to as the "Site"). The legal description for the Site is the Borough of Brooklyn/Kings County Tax Block 7247, Lot 106.

This CHASP provides the minimum requirements for implementing site operations during future remedial measures. All contractors performing work on this site must implement their own CHASP that, at a minimum, adheres to this CHASP. The contractor is responsible for their own health and safety and that of their subcontractors. Langan personnel will implement this CHASP while onsite.

The content of this CHASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the work plan.

1.2 Site Location and Background

A portion of the site was historically operated as a manufactured gas plant (MGP) and was remediated pursuant to a May 12, 1995, Order on Consent and Administrative Settlement (Index No. CO 2-20200901-300) administered by the New York State Department of Environmental Conservation (NYSDEC). The site is registered as New York State Inactive Hazardous Waste Disposal Site No. C224026 and was investigated and remediated by the Responsible Party (The Brooklyn Union Gas Company d/b/a National Grid NY). The site is now subject to ongoing site management in accordance with a June 10, 2019, NYSDEC-approved Site Management Plan (SMP). A Site Location Map is provided in Figure 1.

1.3 Summary of Work Tasks

1.3.1 Geophysical Investigation - Underground Utility Clearance Policy

Prior to the commencement of intrusive field activities (i.e., soil borings); Langan will follow the Langan Underground Utility Clearance Policy including retaining a geophysical consultant to conduct a geophysical survey using ground penetrating radar (GPR) and electromagnetic

detection equipment. The objective of the survey will be to identify any underground storage tank (UST) structures, drains, underground utilities, and other subsurface anomalies that may be encountered during the investigation. During this time Langan personnel will inspect the site and confirm investigation locations are both accessible and free of potential utility or other known or suspected subsurface structures.

1.3.2 “Soft-Dig” Clearance of Borehole Locations

If there is no geophysical survey for utility clearance or the results of the geophysical survey are inconclusive at specific locations subject to intrusive work, or otherwise in compliance with Langan’s Underground Utility Clearance Policy, the drilling contractor may “soft-dig” each proposed drilling location or a separate contractor may be retained to “soft-dig” the locations to confirm they are free of utilities or other known or suspected subsurface structures. The dimensions of each location should extend to a depth of 5-feet and be about 1.5 times the anticipated diameter of the borehole when drilled. Langan personnel will confirm that the “soft dig” activities are completed to these specifications.

1.3.3 Day Lighting Excavation and Soil Screening

Langan may retain an excavation contractor to daylight buried unidentified structures. The purpose of the daylighting is to confirm if these structures are subsurface structures of concern (USTs, utilities sewer lines, storm water drains, electrical, gas or other utility line as well as other artifacts pertinent to the work plan). The excavation contractor will contact the appropriate utility mark-out authority and make available to their staff the verification number and effective dates.

The excavation contractor will employ “soft dig” methods in accordance with the Langan Underground Utility Clearance Policy when excavating. Langan may screen excavated soil for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of volatile organic compounds (VOC) may be performed with a duly calibrated photoionization detector (PID). Contractors will notify Langan personnel if they identify indications suggestive of a potential chemical or petroleum release. Contaminated material shall be handled, and properly disposed in accordance with federal, state and city regulations, criteria, and guidelines.

1.3.4 Excavation and Soil Screening

Langan personnel will screen excavated material for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of volatile organic compounds (VOC) may be performed with a duly calibrated Photoionization detector (PID). Contractors will excavate for utilities, foundation components and potential

grading using heavy equipment and hand tools. Contractors will notify Langan personnel if they identify indications of a potential chemical or petroleum release. Contaminated material must be handled, and properly disposed in accordance with federal, state and city regulations, criteria, and guidelines.

1.3.5 Soil Screening

As part of future excavation activities, the Langan personnel will report when they have observed visual and olfactory indications of possible soil impact. Langan personnel will also report concentrations of VOCs or methane above background when using a properly calibrated handheld PID and flame ionization detector (FID), or equivalent.

1.3.6 Soil Sampling

Soil samples (waste characterization, excavation endpoint, delineation, or quality assurance/quality control [QA/QC]) may be collected during construction, as required. Langan personnel will coordinate with the contractor in sampling soil (in accordance with the Site Management Plan [SMP], where applicable). If stockpile soil sampling is required from above ground level, suitable excavation equipment (i.e., excavator, front end loader) should be used to collect the sample.

Soil samples will be submitted to a NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications.

1.3.7 Endpoint/Delineation Soil Sampling

As part of the excavation activities, Langan may retain a drilling contractor to advance soil borings to a depth bgs specified in the work plan. If required, soil sampling will be completed to delineate suspected hazardous and/or source material areas, should hazardous materials be identified in soil analytical data. Boring locations will be based on the results of previous investigations and document review. The drilling contractor will contact the appropriate utility mark-out authority and make available to their drilling staff the verification number and effective dates. The borings may be filled with clean soil cuttings after samples are collected.

In addition to hazardous delineation, Langan will screen soil for visual, olfactory, and instrumental indicators suggestive of a potential petroleum release. Instrument screening for the presence of VOCs may be performed with a calibrated PID. Soil samples for excavation endpoint or delineation sampling (along with QA/QC samples) will be submitted to a NYSDOH ELAP-certified laboratory and analyzed accordance with work plan specifications.

1.3.8 Stockpiling

As part of future excavation activities, potentially impacted soil may be stockpiled pending laboratory analysis and determining proper off-site disposal. Visibly contaminated soil, if encountered, must be segregated, and stockpiled on at least 10 millimeters of plastic sheeting; reusable soil and fill must be segregated and stockpiled separately from unusable fill, concrete and other debris; the stockpiles must be kept covered with 6 millimeters thick plastic sheeting; the plastic sheeting covering the stockpiles must be anchored firmly in place by weights, stakes, or both; the Contractor must maintain the plastic sheeting.

1.3.9 Characterization of Excavated Material

When required by the work plan, Langan personnel will characterize excavated soil or clean backfill in accordance with Langan standards.

1.3.10 Construction Activity Inspections and Observations

Langan will observe construction activities including the general oversight, observation of landscaping activities, and other select observation, project management, and supervision as specified in the work plan or in accordance with the construction documents, or special inspection requirements administered by the New York City Department of Buildings. Materials used for construction will be inspected by Langan for conformance to the design documents.

1.3.11 Observation/Monitoring Well Plugging and Abandonment

At an unspecified future date, the observation/monitoring wells will be abandoned. Plugging and abandonment will be in accordance with federal and state requirements. Langan may retain a drilling contractor to complete the plugging and abandonment activities. The contractor will contact the appropriate utility mark-out authority and make available to their field staff the verification number and effective dates. Langan may observe the plugging and abandonment of one or more observation/monitoring wells to document that the plugging and abandonment activities were completed in accordance with the work plan and regulations.

1.3.12 QA/QC Sampling

Samples for quality assurance/quality control [QA/QC] may also be collected and submitted to an approved laboratory and analyzed in accordance with work plan specifications. Information regarding the QA/QC samples including required method of analysis may be included in the same COC as the soil samples unless otherwise instructed by the work plan.

1.3.13 Excavation Backfill

Areas of the site that were over-excavated may be backfilled to development grade (i.e., the grade required to complete construction of the foundation and sidewalk extension). Imported material should meet specifications defined in the work plan or consist of clean fill that meets the 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (UU SCOs) or other acceptable fill material such as virgin stone from a permitted mine or quarry or recycled concrete aggregate (RCA), from a New York State Department of Environmental Conservation (NYSDEC)-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. Imported RCA must be derived from recognizable and uncontaminated concrete.

1.3.14 Decommissioning and Removal of Underground Storage Tank

If an underground storage tank (UST) is encountered, a UST decommissioning and removal contractor shall furnish all labor and materials, equipment and incidentals required for the proper decontamination, removal, and closure of any UST in accordance with federal, state and local regulations. Langan personnel will monitor VOCs with a calibrated PID downwind from the UST excavation and record the PID readings.

1.3.15 Construction Dewatering

Construction dewatering may be required, the dewatering contractor shall be responsible for handling contaminated dewatering fluids in accordance with federal, state and local regulations. Dewatering fluids are likely to be discharged to the local sanitary sewer system after treatment and under approved regulatory permit. Alternatively, the contractor may provide containerized storage to allow for testing of groundwater prior to, and after, treatment and before disposal. If required, Langan field personnel may sample dewatering treatment system liquids from either a discharge standpipe or a storage tank. Dewatering samples will be submitted to an ELAP-certified laboratory for analysis.

1.3.16 Installation of an Engineering Composite Cover

Langan will observe and document the installation of an engineering composite cover.

1.3.17 Storm water Pollution Prevention Inspection

If required and in accordance with the SMP, Langan personnel with Storm Water Pollution Prevention (SWPPP) inspection credentials will conduct SWPPP inspections. Langan will observe the stormwater pollution prevention system install to document that the install is in

accordance with the work plan and take appropriate measures if impacted soil is observed during excavation.

1.3.18 Equipment Decontamination

Before the start of the day's sampling and after sampling each run, sampling equipment will be decontaminated by the decontamination process outlined Attachment B - Decontamination Procedures. Decontamination wastes and purge water will be temporarily stored on site pending analytical results.

1.3.19 Management of Investigative-Derived Waste

The investigative-derived waste (IDW) generated during this investigation will be contained in DOT-approved 55-gallon drums. The drums will be temporarily stored on the site or as directed by the client representative. All drums will be filled between to two-thirds full to allow easy maneuvering during drum pickup and disposal. Drum labels are to be provided by Langan (Environmental Closet). All drums will be labeled as "IDW Pending Analysis" until sample data are reported from the laboratory. Drum labels will include date filled and locations where waste was generated along with the standard information required by the labels in accordance with the Langan SOP09, Drum Labeling.

Closed top drums are to be used to store liquids. Debris, including plastic sheeting, polyethylene tubing, personal protection equipment (PPE), decontamination debris, etc. will be segregated from and disposed in large heavy duty garbage bags and disposed of at the site. Excess unused glassware should be returned to the lab along with the last day of collection samples.

1.3.20 Drum Sampling

Langan personnel may collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to an approved laboratory and analyzed in accordance with work plan specifications, if required.

1.3.21 Surveying

Surveying activities may be completed by Langan. Surveying will be conducted by licensed surveyors.

2.0 IDENTIFICATION OF KEY PERSONNEL/HEALTH AND SAFETY PERSONNEL

The following briefly describes the health and safety (H&S) designations and general responsibilities that may be employed for this site. The titles have been established to accommodate the project needs and requirements and ensure the safe conduct of site activities. The H&S personnel requirements for a given work location are based on the proposed site activities.

2.1 Langan Project Manager

The Langan Environmental Project Manager (PM) is Elizabeth Adkins and the Site/Civil PM is Brian Conway, their responsibilities include:

- Ensuring that this CHASP is developed, current, and approved prior to on-site activities.
- Ensuring that the tasks in the project are performed in a manner consistent with Langan's comprehensive *Construction Health and Safety Program for Hazardous Waste Operations* and this CHASP.

2.2 Langan Corporate Construction Health and Safety Manager

The Langan Corporate Construction Health and Safety Manager is Tony Moffa. His responsibilities include:

- Updating the *Construction Health and Safety Program for Hazardous Waste Operations*.
- Assisting the site Construction Health and Safety Officer (HSO) with the development of the CHASP, updating CHASP as dictated by changing conditions, job site inspection results, etc., and approving changes to this CHASP.
- Assisting the HSO in the implementation of this CHASP and conducting Jobsite Safety Inspections and assisting with communication of results and correction of shortcomings found.
- Maintaining records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

2.3 Langan Site Health & Safety Officer

The Langan site HSO is William Bohrer. His responsibilities include:

- Participating in the development and implementation of this CHASP.
- When on-site, assisting the Langan Field Team Leader in conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely

manner.

- Ensuring that proper PPE is available, worn by employees, and properly stored and maintained.
- Controlling entry into and exit from the site contaminated areas or zones.
- Monitoring employees for signs of stress, such as heat stress, fatigue, and cold exposure.
- Monitoring site hazards and conditions.
- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Resolving conflicts that may arise concerning safety requirements and working conditions.
- Reporting all incidents, injuries, and near misses to the Langan Incident/Injury Hotline immediately and the client representative.

2.4 Langan Field Team Leader Responsibilities

The Langan Field Team Leader (FTL) is to be determined prior to the start of field activities. The Field Team Leader's responsibilities include:

- The management of the day-to-day site activities and implementation of this CHASP in the field.
- Participating in and/or conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- When a Community Air Monitoring Operating Program (CAMP) is part of the scope, the FTL will set up and maintain community air monitoring activities and instruct the responsible contractor to implement organic vapor or dust mitigation when necessary.
- Overseeing the implementation of activities specified in the IRMWP.

2.5 Contractor Responsibilities

The contractor must develop and implement their own CHASP for their employees, their subcontractors, and consultants. The contractor is responsible for their own health and safety and that of their subcontractors. Contractors operating on the site must designate their own FTL, HSO, and Construction Health and Safety Manager (HSM). The contractor's CHASP will be at least as stringent as this CHASP. The contractor must be familiar with and abide by the requirements outlined in their own CHASP. A contractor may elect to adopt Langan's CHASP as its own provided that it has given written notification to Langan, but where Langan's CHASP excludes provisions pertinent to the contractor's work (i.e., confined space entry); the contractor must provide written addendums to this CHASP. Additionally, the contractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved.
- Notify Langan of any hazardous material brought onto the job site or site-related area, the hazards associated with the material, and must provide a material safety data sheet (MSDS) or safety data sheet (SDS) for the material.
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertaining to the work.
- Ensure their employees handling hazardous materials, if identified at the Site, have received current training in the appropriate levels of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) if hazardous waste is identified at the Site.
- Ensure their employees handling hazardous materials, if identified at the Site, have been fit-tested within the year on the type of respirator they will wear; and
- Ensure all air monitoring is in place pertaining to the health and safety of their employees as required by OSHA 1910.120; and
- All contractors must adhere to all federal, state, and local regulatory requirements.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSES

A Task-Hazard Analysis (Table 1) was completed for general construction hazards that may be encountered at the Site. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2 complete inventory of MSDS/SDS for chemical products used on site is included in Attachment E.

3.1 Specific Task Safety Analysis

3.1.1 Geophysical Survey

Langan personnel are not permitted to operate or otherwise handle the geophysical equipment including any downhole geophysical equipment subsequently used to survey boreholes. When boring locations are surveyed with surface geophysical equipment, the locations of the borings as well as utilities and other artifacts that may interfere with the subsurface investigation are to be marked with indelible paint, flags, or color tape (when marking indoor locations that the client has specifically requested not be marked with indelible paint). This information must also be added to the site map. When applying paint, proper PPE including at a minimum hand protection should be used.

3.1.2 "Soft Dig" Clearance of Borehole Locations

"Soft-Dig" clearance will be completed by the contractor. Langan personnel are not permitted

to operate or otherwise handle the contractor's equipment. Langan will update the site map to include the locations of the cleared borehole locations as well as utilities and other artifacts that may interfere with the subsurface investigation.

3.1.3 Daylighting Test Pit

Excavation daylighting must abide by OSHA excavation standards (Part 1926.651) and conform to the Langan Underground Utility Clearance Policy. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate excavation equipment. This task is to be completed by the excavation contractor.

3.1.4 Indoor Drilling and Excavation

The work scope may require indoor excavation where there may not be adequate ventilation sufficient to safely operate any rig or excavation equipment powered by an internal combustion engine. Where possible, all such work should be done by equipment powered by electricity. If such equipment is used and must be directly wired to the buildings electrical system or to an independent system, this work must be completed by a licensed electrician in accordance with all electrical codes applicable to the work.

Indoor work which is to be completed with equipment powered by an internal combustion engine must incorporate air monitoring of carbon monoxide (CO) using calibrated air monitoring equipment (MultiRAE or equivalent). In addition, the work plan should incorporate mitigation for venting engine exhaust fumes directly to the outdoors and for circulating fresh air into the work area.

The OSHA Time Weighted Average (TWA) Permissible Exposure Limit (PEL) for CO from 50 to 35 parts per million (ppm). Langan will monitor CO with a suitable monitoring device. If CO levels exceed 5 ppm, Langan will instruct contractors to begin mitigation measures. These measures are at a minimum:

- Increase air circulation using industrial size fans to bring additional fresh air into the building or vent exhaust to the outside.
- Modify the passive exhaust method being used to increase venting circulation by using wider diameter tubing or sealing tubing connections; or

- Modify the work schedule where the rig is turned off to allow time for CO levels to fall back to background.

All work must cease if CO levels reach 35 ppm. The Langan engineer is to report to the PM and H&S officer when an action level is reached.

3.1.7 Soil Investigation and Sampling

Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate drilling or excavation equipment nor open sampling devices (acetate liners, sonic sample bags, etc.). These tasks are to be completed by the driller or excavation contractor.

3.1.8 Excavation and Soil Screening

Langan personnel will observe excavation and SOE activities including the general oversight, observation of landscaping activities, and other select observation project management and supervision as specified in the work plan or in accordance with the construction documents, or special inspection requirements administered by the DOB. Materials used for construction may be inspected by Langan personnel for conformance to the design documents. Prior to entering excavation, Langan personnel will ensure that excavation shoring conforms to proper shoring/benching/sloping techniques, at a minimum that soil and equipment is kept at least 2 feet from the edge of the excavation, that there is no water in the excavation, and that a competent person has inspected excavation prior to allow persons to enter. When entering excavation via a ladder, Langan personnel will only use ladders that are properly situated in accordance with the Ladder section of the CHASP.

3.1.9 Soil Screening and Sampling

Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate drilling or excavation equipment nor open sampling devices (acetate liners, sonic sample bags, etc.). These tasks are to be completed by the driller or excavation contractor.

3.1.10 Stockpile Sampling

The Langan personnel are not to scale or climb stockpiles. If the soil sampling plan requires sampling from the stockpile above ground level, samples are to be obtained using suitable excavation equipment operated by the contractor (i.e., front end loader).

3.1.11 Construction Dewatering

If required, Langan may sample dewatering treatment system liquids from either the direct discharge standpipe or from a sample port or valve built into the storage tank, Langan will don the necessary PPE including nitrile gloves and if necessary, facial splash guard. Sample ports and valves may only be sampled if they are accessible at ground level. Sampling from heights over 6 feet is prohibited unless Langan field personnel are fully accredited in fall protection and is wearing approved fall protection safety apparatus. The discharge samples will be submitted to an ELAP-certified laboratory for analysis in accordance with the work plan.

3.1.12 Construction Activity Inspection

Langan personnel will conduct inspections as specified in the work plan. Langan may record the data the work plan requires. All future repair work to the engineering controls will be done exclusively by the contractor following their own health and safety specifications outlined in their HASPs. Other activities assigned to Langan as part of work activities are limited to inspection and observations as specified in the SMP or future work plans. Langan personnel are not to operate or assist in the operation of equipment used in construction activities unless defined as part of an inspection or observation in the work plan.

3.1.13 Installation of the Composite Cover

Specifically trained contractors are to install the composite cover. Langan personnel are there only to observe and record the data required in the work plan. Installation and assemblage of the composite cover is to be done exclusively by the contractor following their own health and safety specific CHASP.

3.1.14 Storm water Pollution Prevention Inspection

When performing SWPPP inspections, Langan personnel will don all required PPE and maintain awareness to site traffic and site activities. If using a cell phone or tablet application to record the pertinent data, the engineer will do so in an area protected from site traffic and activities. Certain types of inspections may require additional PPE and safety training including fall protection and open water hazards.

3.1.15 Drum Sampling

Drilling fluid, rinse water, grossly contaminated soil samples, and cuttings will be containerized in 55-gallon drums for disposal off-site. Each drum must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP09). Sampling drums requires the donning of

work gloves when opening the drums and chemical resistant gloves when sampling in addition to standard PPE.

3.2 Radiation Hazards

No radiation hazards are known or expected at the site.

3.3 Physical Hazards

Physical hazards, which may be encountered during site operations for this project, are detailed in Table 1.

3.3.1 Explosion

No explosion hazards are expected for the scope of work at this site.

3.3.2 Heat Stress

The use of Level C protective equipment, or greater, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 72°F or above. Table 6 presents the suggested frequency for such monitoring. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Refer to Table 7 to assist in assessing when the risk for heat-related illness is likely. To use this table, the ambient temperature and relative humidity must be obtained (a regional weather report should suffice). Heat stress monitoring should be performed by the HSO or the FTL, who must be able to recognize symptoms related to heat stress.

To monitor the workers, be familiar with the following heat-related disorders and their symptoms:

- **Heat Cramps:** Painful spasms of arm, leg, or abdominal muscles, during or after work
- **Heat Exhaustion:** Headache, nausea, dizziness; cool, clammy, moist skin; heavy sweating; weak, fast pulse; shallow respiration, normal temperature
- **Heat Stroke:** Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. *This is a life-threatening condition.*

Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness.

To monitor the worker, measure:

- **Heart rate:** Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.
- **Oral temperature:** Use a clinical thermometer (3 minutes under the tongue) or a similar device to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6°F. If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third. Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

Prevention of Heat Stress - Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat-related illnesses. To avoid heat-stress the following steps should be taken:

- Adjust work schedules.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for every eight ounces (0.23 kilograms [kg]) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
 - Maintain water temperature 50° to 60°F (10° to 16.6°C).
 - Provide small disposal cups that hold about four ounces (0.1 liters).
 - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.

- Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
- Train workers to recognize the symptoms of heat-related illness.

3.3.3 Cold-Related Illness

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is called frostbite.

- **Hypothermia** - Hypothermia is defined as a decrease in the patient core temperature below 96°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include shivering, apathy, listlessness, sleepiness, and unconsciousness.
- **Frostbite** - Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20°F. Symptoms of frostbite are a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of Cold-Related Illness - To prevent cold-related illness:

- Educate workers to recognize the symptoms of frostbite and hypothermia.
- Identify and limit known risk factors:
- Assure the availability of an enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Assure the availability of warm drinks.
- Start (oral) temperature recording at the job site:
- At the FSO or Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
- As a screening measure whenever anyone worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92°F) cannot return to

work for 48 hours.

3.3.4 Noise

Work during the proposed activities may be conducted at locations with high noise levels from the operation of equipment. Hearing protection will be used, as necessary.

3.3.5 Hand and Power Tools

The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut, or struck by the tool, fire, and electrocution. All hand and power tools should be inspected for health and safety hazards prior to use. If deemed unserviceable/un-operable, notify the supervisor and tag equipment out of service. Ground Fault Circuit Interrupters (GFCIs) are required for all power tools requiring direct electrical service.

3.3.6 Slips, Trips, and Fall Hazards

Care should be exercised when walking at the site, especially when carrying equipment. The presence of surface debris, uneven surfaces, pits, facility equipment, and soil piles contribute to tripping hazards and fall hazards. To the extent possible, all hazards should be identified and marked on the site, with hazards communicated to all workers in the area.

3.3.7 Utilities (Electrocution and Fire Hazards)

3.3.7.1 Utility Clearance

The possibility of encountering underground utilities poses fire, explosion, and electrocution hazards. All excavation work will be preceded by a review of available utility drawings and by notification of the subsurface work to N.Y. One –Call–Center.

3.3.7.2 Lockout-Tagout

The potential adverse effects of electrical hazards include burns, arc flashes, and electrocution, which could result in serious injury including death. Therefore, there is a procedure that establishes the requirements for the lockout/tag out (LOTO) of energy isolating devices in accordance with the OSHA electrical lockout and tagging requirements as specified in 29CFR1910.147 and 29 CFR 1926.417. This procedure will be used to ensure that all machines and equipment are isolated from potentially hazardous energy. If possible, equipment that could cause injury due to unexpected energizing, start-up, or release of stored energy will be locked/tagged, before field personnel performs work activities.

The facility owner/operator/representative is to be the authorized person that will initiate and perform the LOTO in accordance with applicable rules and practices. Inerting of electrical power sources is to be completed by an authorized and licensed electrician. Langan personnel will follow LOTO protocols and practices including adding a separate lock/signature to the LOTO chain in accordance with said protocols and practices.

SPECIAL NOTE: Project personnel will assume that all electrical equipment at the surface, subsurface, and overhead locations are energized until equipment has been designated and confirmed as de-energized by a utility company representative. Langan will notify the designated utility representative prior to working adjacent to this equipment and will verify that the equipment is energized or de-energized in the vicinity of the work location. No project work shall be performed by Langan personnel or subcontractors near energized electrical lines or equipment.

The FTL shall accompany the designated facility owner/operator/representative or authorized/licensed electrician in surveying to locate and identify all energy-isolating devices. Langan will note which switches, valves or other isolating devices are used for inerting the equipment and how they are set assuring LOTO. The lockout/tagout procedure involves, but is not limited to, electricity, motors, steam, natural gas, compressed air, hydraulic systems, digesters, sewers, etc.

3.3.8 Adequate Lighting

Indoor or night activities must be done under adequate lighting conditions. The Langan field engineer must be able to clearly see the equipment, all controls and have sufficient lighting to detail color labels. Battery operated lights are sufficient provided they cast a wide enough field to provide the required lighting and there are back-up batteries and emergency flashlights available. Electrically powered lights are suitable provided the electrical source is equipped with a ground fault interrupt circuit (GFIC) and the extensions cords are visually inspected and not used if they show cracked or missing insulation. If a generator is supplying the electricity, it must be outdoors and properly vented.

3.3.9 Physical Hazard Considerations for Material Handling

There are moderate to severe risks associated with moving heavy objects at the Site. The following physical hazards should be considered when handling materials at the Site:

- Heavy objects will be lifted and moved by mechanical devices rather than manual effort whenever possible.
- The mechanical devices will be appropriate for the lifting of moving tasks and will be operated only by trained and authorized personnel.

- Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects.
- Lifting devices will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.
- The wheels of any trucks being loaded or unloaded will be choked to prevent movement. Outriggers will be fully extended on a flat, firm surface during operation.
- Personnel will not pass under a raised load, nor will a suspended load be left unattended.
- Personnel will not be carried on lifting equipment unless it is specifically designed to carry passengers.
- All reciprocating, rotating, or other moving parts will be guarded at all times.
- Accessible fire extinguishers, currently (monthly) inspected, will be available in all mechanical lifting devices.
- Verify all loads/materials are secure before transportation.

Material handling tasks that are unusual or require specific guidance will need a written addendum to this CHASP. The addendum must identify the lifting protocols before the tasks are performed. Upon approval, the plan must be reviewed with all affected employees and documented. Any deviation from a written plan will require approval by the Langan HSM.

3.3.10 Hearing Conservation

Under the construction industry standard, the maximum permissible occupational noise exposure is 90 A-weighted decibels (dba) (8-hour TWA), and noise levels in excess of 90 dba must be reduced through feasible administrative and engineering controls (20 CFR 1926.52). Hearing protection is required when working within 15 feet of vacuum extraction equipment and drill rigs.

3.3.11 Open Water

Employees working over or near water, where the danger of drowning exists, must be provided with U.S. Coast Guard-approved life jackets or buoyant work vests. Prior to and after each use, the buoyant work vests or life preservers must be inspected for defects that would alter their strength or buoyancy. Defective units must not be used.

And should a worker fall into the water, OSHA requires (29 CFR 1926.106(c)) that ring buoys with at least 90 feet of the line must be provided and readily available for emergency rescue operations. The distance between ring buoys must not exceed 200 feet. Another remedial action required by OSHA (29 CFR 1926.106(d)) is the use of lifesaving skiffs.

OSHA requires that at least one lifesaving skiff must be immediately available at locations where employees are working over or adjacent to water and must include the following provisions.

- The skiff must be in the water or capable of being quickly launched by one person.
- At least one person must be present and specifically designated to respond to water emergencies and operate the skiff at all times when there are employees above water.
- When the operator is on break another operator must be designated to provide requisite coverage when there are employees above water.
- The designated operator must either have the skiff staffed at all times or have someone remain in the immediate area such that the operator can quickly reach the skiff and perform rescue services.
- The skiff operator may be assigned other tasks provided the tasks do not interfere with the operator's ability to quickly reach the skiff.
- A communication system, such as a walkie-talkie, must be used to inform the skiff operator of an emergency and to inform the skiff operator where the skiff is needed.
- The skiff must be equipped with both a motor and oars.

With regard to the number of skiffs required and the appropriate maximum response time, the following factors must be evaluated:

- The number of work locations where there is a danger of falling into water.
- The distance to each of those locations.
- Water temperature and currents.
- Other hazards such as, but not limited to, rapids, dams, and water intakes.

Other regulations that present H&S practices and PPE for work on or near water include: 29 CFR 1910, Subpart T (401 – 440)

3.4 Biological Hazards

3.4.1 Animals

There is a possibility of encountering wildlife including reptiles, rodents, and other small and medium-size mammals. Langan personnel are to avoid interacting with any wildlife.

3.4.2 Insects

Ticks and other biting or stinging insects may be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and insecticide to prevent bites and stings. After fieldwork, Langan personnel should perform a complete visual

inspection of their clothing to insure they are not inadvertently harboring ticks. If they do observe a tick bite, they are to contact the HSM or HSO and report the event.

3.4.3 Plants

Poisonous plants may be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and applying preventative poison Ivy/Sumac lotion to prevent or limit the effects of exposure. If after fieldwork, Langan employees do observe a reaction to poisonous plant exposure, they are to contact the HSM or HSO and report the event.

3.4.4 Mold

This section is restricted to subsurface investigations where sampling soil, groundwater, soil or sub-slab vapor or ambient air in an indoor environment with slight to moderate mold impact. Mold exposure symptoms include nasal stuffiness, eye irritation, or wheezing.

The Langan field engineer is required to don a ½ face respirator with a minimum p-100 particulate filter and Tyvek™ type overclothing before entering mold impacted indoor work area. The Langan field engineer must be medically cleared and have been properly fitted for a respirator before donning one.

3.5 Additional Safety Analysis

3.5.1 Presence of Non-Aqueous Phase Liquids (NAPL)

Special care and PPE should be considered when NAPL is observed as NAPL is a typically flammable fluid and releases VOCs known to be toxic and/or carcinogenic. If NAPL is present in a monitoring well, vapors from the well casing may contaminate the work area breathing zone with concentrations of VOCs potentially exceeding health and safety action levels. In addition, all equipment used to monitor or sample NAPL (or ground water from wells containing NAPL) must be intrinsically safe. Equipment that directly contacts NAPL must also be resistant to organic solvents.

At a minimum, a PID should be used to monitor for VOCs when NAPL is observed. If NAPL is expected to be observed in an excavation or enclosed area, air monitoring must be started using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e., MultiRAE). However, in oxygen-depleted atmospheres (confined space), only an LEL designed

to work in low-oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation.

When NAPL is present, Langan personnel are required to use disposable nitrile gloves at all times to prevent skin contact with contaminated materials. They should also consider having available a respirator and protective clothing (Tyvek® overalls), especially if NAPL is in abundance and there are high concentrations of VOCs.

All contaminated disposables including PPE and sampling equipment must be properly disposed of in labeled 55-gallon drums.

3.6 Job Safety Analysis

A Job Safety Analysis (JSA) is a process to identify existing and potential hazards associated with each job or task so these hazards can be eliminated, controlled, or minimized. A JSA will be performed at the beginning of each workday, and additionally whenever an employee begins a new task or moves to a new location. All JSAs must be developed and reviewed by all parties involved. A blank JSA form and documentation of completed JSAs are in Attachment G.

4.0 PERSONNEL TRAINING

4.1 Basic Training

Completion of an initial 40-hour HAZWOPER training program as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees working on a site engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances, health hazards, or safety hazards as defined by 29 CFR 1910.120(a). Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment. In addition to these training requirements, all employees must complete the OSHA 10-hour Construction Safety and Health training and supervisory personnel must also receive eight additional hours of specialized management training. Training records are maintained by the HSM.

4.2 Initial Site-Specific Training

Training will be provided to specifically address the activities, procedures, monitoring, and equipment for site operations at the beginning of each field mobilization and the beginning of each discrete phase of work. The training will include the site and facility layout, hazards, and emergency services at the site, and will detail all the provisions contained within this CHASP. For a HAZWOPER operation, training on the site must be for a minimum of 3 days. Specific issues that will be addressed include the hazards described in Section 3.0.

4.3 Tailgate Safety Briefings

Before starting work each day or as needed, the Langan HSO will conduct a brief tailgate safety meeting to assist site personnel in conducting their activities safely. Tailgate meetings will be documented in Attachment H. Briefings will include the following:

- Work plan for the day.
- Review of safety information relevant to planned tasks and environmental conditions.
- New activities/tasks being conducted.
- Results of Jobsite Safety Inspection Checklist.
- Changes in work practices.
- Safe work practices; and
- Discussion and remedies for noted or observed deficiencies.

5.0 MEDICAL SURVEILLANCE

All personnel who will be performing fieldwork involving potential exposure to toxic and hazardous substances (defined by 29 CFR 1910.120(a)) will be required to have passed an initial baseline medical examination, with follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine.

Additionally, personnel who may be required to perform work while wearing a respirator must receive medical clearance as required under CFR 1910.134(e), *Respiratory Protection*. Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine. Results of medical evaluations are maintained by the HSM.

5.1 Mercury Monitoring

Langan includes medical monitoring for mercury during the initial baseline and annual physical.

5.2 Coronavirus

General Preventative Measures

Field personnel must follow general proper hygiene measures while in the field including:

- Avoid touching eyes, nose, and mouth.
- Cover coughs or sneezes with tissue and throw in the trash.
- Wash hands often with soap and water for 20 seconds after going to the bathroom, before eating, after blowing nose, coughing, or sneezing.

- Use hand sanitizer with at least 60% alcohol if soap and water are not available.
- Avoid physical contact with other people (e.g., no handshakes).
- Maintain a safe distance of at least six feet from other people (social distancing).
- Wear face coverings when around other workers to minimize the spread of COVID-19.
(May be required in certain states or locations.)

Construction Trailers

Employees should avoid the use of shared construction trailers or where employees cannot maintain a safe distance (minimum 6 feet) from other workers. If trailer use is needed, areas such as desks, phones, chairs, and other common areas, should be cleaned and disinfected before and after use. Protocols should be developed to minimize trailer use to essential personnel, restrict use from any workers who are ill or showing symptoms of being ill, use face coverings and ensure a safe distance of six feet can be established between workers.

Communication

Include Coronavirus topics and prevention topics in daily tailgate meetings to ensure Coronavirus awareness is communicated daily. Discussions can focus on general topics including social distancing, prevention measures for field personnel, signs and symptoms, and recent news on the Coronavirus. Site-specific topics should include minimizing face-to-face contact, disinfecting/sterilizing field equipment, use of PPE to reduce exposure, site security, use of face coverings, and other potential exposure issues/concerns.

Sick/Ill Workers

No Langan employee is permitted to be onsite when ill and/or showing potential symptoms of the Coronavirus. Symptoms of the Coronavirus may appear 2-14 days after exposure and can range from mild to severe. The most common symptoms include fever, fatigue, dry cough, shortness of breath chills, repeated shaking with chills, muscle pain, headache, sore throat, or new loss of taste or smell. If an employee or subcontractor is observed being ill or exhibiting symptoms of Coronavirus, employees must immediately utilize their Stop Work Authority and contact their project manager to address the situation. If an employee observes another worker onsite exhibiting symptoms of Coronavirus, immediately utilize Stop Work Authority, notify their project manager, and site construction manager or safety officer. Work should resume when the safety and health of Langan and subcontractors is adequately addressed.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 Levels of Protection

Langan will provide PPE to Langan employees to protect them from the specific hazards they are likely to encounter on-site. Directly hired contractors will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards.

Human exposure to contaminants found in the subsurface can occur through three primary routes:

- Inhalation of gases, vapors, dust, or mists is a common route of exposure. Chemicals can enter and irritate the airways and the lungs. They can become deposited in the airways or can be absorbed through the lungs into the bloodstream.
- Direct contact of contaminants with the skin or eyes is a common route of exposure. Some substances are absorbed through the skin and can enter the bloodstream. Broken, cut, or cracked skin will allow substances to enter the body more easily.
- Ingestion or swallowing of food, drink, or other substances is the third route of exposure. Chemicals that get in or on food, utensils, or hands can be ingested. Substances can be absorbed into the blood.

Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D protection will be used. The upgrading/downgrading of the level of protection will be based on continuous air monitoring results as described in Section 6.0 (when applicable). The decision to modify standard PPE will be made by the site HSO or FTL after conferring with the PM. The levels of protection are described below.

Level D Protection (as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes
- Coveralls (Tyvek® or equivalent)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection

- Reflective safety vest

Level D Protection (Modified, as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes (toe-protected)
- Disposable chemical-resistant boot covers.
- Coveralls (poly-coated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection (as needed)
- Personal floatation device (for work within 5 ft of the water)
- Reflective traffic vest

Level C Protection (as needed)

- Full or Half face, air-purifying respirator, with NIOSH approved High-Efficiency Particulate Air (HEPA) filter.
- Inner (latex) and outer (nitrile) chemical-resistant gloves
- Safety glasses with side shields or chemical splash goggles
- Chemical-resistant safety boots/shoes
- Hard hat
- Long sleeve work shirt and work pants
- Coveralls (Tyvek® or equivalent)
- Hearing protection (as needed)
- Reflective safety vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C are summarized in Table 4. The written Respiratory Protection Program is maintained by the HSM and is available if needed. The monitoring procedures and equipment are outlined in Section 6.0 (when applicable).

6.2 Respirator Fit-Test.

All Langan employees who may be exposed to hazardous substances at the work site must be in possession of a full or half face piece air-purifying respirator and have been successfully fit-tested within the past year. Fit-test records are maintained by the HSM.

6.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (Table 2) are reached. A respirator cartridge change-out schedule has been developed to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges must be removed and disposed of at the end of each shift when cartridges become wet or the wearer experiences a breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges must be removed and disposed of after 4 hours of use.

Respirators must not be stored at the end of the shift with contaminated cartridges left on. Cartridges must not be worn on the second day, no matter how short the time period was the previous day they were used.

7.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

7.1 Monitoring During Site Operations

Atmospheric air monitoring results may be collected and used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments, there are Site-specific action-level criteria that are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the HSO may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established CHASP action levels.

During site work involving disturbance of petroleum-impacted or fill material, real-time air monitoring may be conducted for methane and VOCs. A MultiRAE LEL/Oxygen (O₂) meter and FID will be used to monitor the LEL of methane, and a PID and/or FID will be used to monitor concentrations of VOCs at personnel breathing-zone height. Air monitoring will be the responsibility of the HSO or designee. Air monitoring may be conducted during intrusive activities associated with the completion of excavation, debris removal, and soil grading. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal to or more stringent than the Langan plan.

An air monitoring calibration log is provided in Attachment D of this CHASP.

7.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (10.6v) or equivalent may occur during intrusive work in the Areas of Concern (AOCs). Colorimetric Indicator Tubes for benzene may be used as a backup for the PID if measurements remain above background monitor every 2 hours. The HSO will monitor the employee's breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, etc.) since the last measurement. If VOC levels are observed above 5 ppm for longer than 5 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for monitored gases are provided in Table 4.

7.1.2 Metals

Based upon the site historical fill, there is a potential for the soils to contain Polycyclic Aromatic Hydrocarbons (PAHs) and metals. During invasive procedures which have the potential for creating airborne dust, such as excavation of dry soils, a real-time airborne dust monitor such as a Mini-Ram may be used to monitor for air particulates. The HSO will monitor the employee's breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. If dust levels are observed to be greater than 0.100 milligrams per cubic meter (mg/m³) or visible dust is observed for longer than 15 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for dust monitoring are provided in Table 4.

7.1.3 Methane

During soil excavation or other intrusive activities, direct reading air monitoring may be performed in the excavation area to determine exposure to workers. Monitoring with an LEL/O₂ meter and FID may occur during intrusive work in the AOCs. The HSO will monitor the employee's breathing zone at least hourly during intrusive activities. If LEL levels are observed above 20% the professional engineer (PE) or their designee will stop work and evacuate the area; warn others; and determine source of readings and take corrective actions. The Contractor will be responsible for mitigating explosive gas levels.

7.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration must be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments must be calibrated

before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument responses.

All instruments must be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operation manual for each piece of monitoring equipment, will be maintained on-site by the HSO for reference.

7.3 Determination of Background Levels

Background (BKD) levels for VOCs, dust, and methane will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the HSO.

Table 4 lists the instrument action levels.

8.0 COMMUNITY AIR MONITORING PROGRAM

Community air monitoring may be conducted in compliance with local standards. If conducted, Langan will implement the generic CAMP outlined below amended to comply with local conditions or standards:

Monitoring for dust and odors will be conducted during all ground intrusive activities by the FTL. Continuous monitoring of the perimeter of the work zones for odor, VOCs, and dust may be required for all ground intrusive activities such as soil excavation and handling activities. The work zone is defined as the general area in which machinery is operating in support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring for VOCs during activities such as soil and groundwater sampling and soil excavation. The site perimeter will be monitored for fugitive dust emissions by visual observations as well as instrumentation measurements (if required). When required, particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the local standards or, default to the performance standards below:

If VOC monitoring is required, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the

source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps work activities will resume provided that the total organic vapor level is 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm above background for the 15-minute average.

- If the total VOC level is above 25 ppm at the perimeter of the hot zone, activities will be shut down.

If dust monitoring with field instrumentation is required, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind particulate matter less than 10 microns (PM10) levels do not exceed 150 $\mu\text{g}/\text{m}^3$ above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 $\mu\text{g}/\text{m}^3$ above the background level, work must be stopped, and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 $\mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

8.1 Dust Suppression Techniques

Preventative measures for dust generation may include wetting site fill and soil, construction of an engineered construction entrance with a gravel pad, a truck wash area, covering soils with tarps, and limiting vehicle speeds to five miles per hour.

Work practices to minimize odors and vapors include limiting the time that the excavations remain open, minimizing stockpiling of contaminated-source soil, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include direct load-out of soils to trucks for off-site disposal; use of chemical

odorants in spray or misting systems; and use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

9.0 WORK ZONES AND DECONTAMINATION

9.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. Specific zones will be established on the work site by the Contractor when operations begin for each task requiring such delineation. Maps depicting the zones will be available at the Site.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials, and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be delineated by cones, tapes, or other means. The HSO may establish more than one EZ where different levels of protection may be employed, or different hazards exist. The size of the EZ must be determined by the HSO allowing adequate space for the activity to be completed, field members, and emergency equipment.

9.2 Contamination Zone

9.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

9.2.2 Minimization of Contact with Contaminants

During the completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and another physical contact with contamination as PPE is intended to minimize accidental contact. This may minimize

the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control spray and runoff and to ensure that unprotected personnel working nearby are not affected.

9.2.3 Personnel Decontamination Sequence

Decontamination may be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes should be available for wiping hands and face. Drums/trash cans will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, and tools are provided below.

9.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment. If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions must be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exists, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel should be immediately informed of the injured person's condition, and potential contaminants, and provided with all pertinent data.

9.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

9.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving to work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the HSO or his designee.

9.3 Support Zone

The support zone or cold zone will include the remaining areas of the job site. Break areas and support facilities (including equipment storage and maintenance areas) will be located in this zone. No equipment or personnel will be permitted to enter the cold zone from the hot zone without passing through the decontamination station in the warm zone (if necessitated). Eating, smoking, and drinking will be allowed only in this area.

9.4 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the HSO for communication with the HSM and emergency support services/facilities.
- Hand Signals - Hand signals must be used by field teams, along with the buddy system. The entire field team must know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

Hand Signal	Meaning
Hand gripping throat	Out of air, cannot breathe
Grip your partner's wrists or place both hands around the waist	Leave immediately without debate
Hands on top of head	Need assistance
Thumbs up	OK; I am all right; I understand
Thumbs down	No; negative
Simulated "stick" break with fists	Take a break; stop work

9.5 The Buddy System

When working in teams of two or more, workers will use the "buddy system" for all work activities to ensure that rapid assistance can be provided in the event of an emergency. This requires work groups to be organized such that workers can remain close together and maintain visual contact with one another. Workers using the "buddy system" have the following responsibilities:

- Provide his/her partner with assistance.
- Observe his/her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his/her partner's PPE.
- Notify the HSO or other site personnel if emergency service is needed.

10.0 NEAREST MEDICAL ASSISTANCE

The address and telephone number of the nearest hospital:

New York City Health and Hospitals/Coney Island
2601 Ocean Parkway
Brooklyn, New York
718-616-3000

A map with directions to the hospital is shown in Figure 2. This information will either be posted prominently at the site or will be available to all personnel all of the time. Further, all field personnel, including the HSO & FTL, will know the directions to the hospital.

11.0 STANDING ORDERS/SAFE WORK PRACTICES

The standing orders, which consist of a description of safe work practices that must always be followed while on-site by Langan employees and contractors, are shown in Attachment A. The site HSO and FTL each have the responsibility for enforcing these practices. The standing orders will be posted prominently at the site or are made available to all personnel at all times. Those who do not abide by these safe work practices will be removed from the site.

12.0 SITE SECURITY

No unauthorized personnel must be permitted access to the work areas.

13.0 UNDERGROUND UTILITIES

As provided in Langan's Underground Utility Clearance Guidelines, the following safe work practices should be followed by Langan personnel and the contractor before and during subsurface work in accordance with federal, state, and local regulations:

- Obtain available utility drawings from the property owner/client or operator.
- Provide utility drawings to the project team.
- In the field, mark the proposed area of subsurface disturbance (when possible).
- Ensure that the utility clearance system has been notified.
- Ensure that utilities are marked before beginning subsurface work.

- Discuss subsurface work locations with the owner/client and contractors.
- Obtain approval from the owner/client and operators for proposed subsurface work locations.
- Use safe digging procedures when applicable.
- Stay at least 10 feet from all equipment performing subsurface work.

14.0 SITE SAFETY INSPECTION

The Langan HSO or alternate will check the work area daily, at the beginning and end of each work shift, or more frequently to ensure safe work conditions. The HSO or alternate must complete the Jobsite Safety Inspection Checklist, found in Attachment F. Any deficiencies must be shared with the FTL, HSM, and PM and will be discussed at the daily tailgate meeting.

15.0 HAND AND POWER TOOLS

All hand- and electric-power tools and similar equipment must be maintained in a safe operating condition. All electric-power tools must be inspected before initial use. Damaged tools must be removed immediately from service or repaired. Tools must be used only for the purpose for which they were designed. All users must be properly trained in their safe operation.

16.0 EMERGENCY RESPONSE

16.1 General

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, and preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures. In case of emergency, in addition to 911, call WorkCare - Incident Intervention@ at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **973-560-4699** as soon as possible.

Should outside assistance be needed for accidents, fire, or release of hazardous substances, the emergency numbers will be available and posted at the site (Table 5) where a readily accessible telephone is made available for emergency use.

Also, in the event of an incident where a team member becomes exposed or suffers from an acute symptom from contact with site materials and has to be taken to a hospital, a short medical

data sheet (Attachment C) for that individual will be made available to the attending physician. The medical data sheet will include the following:

- Name, address, home phone
- Age, height, weight
- Name of person to be notified in case of an accident.
- Allergies
- Particular sensitivities
- Does he/she wear contact lenses?
- Short checklist of previous illness
- Name of personal physician and phone
- Name of company physician and phone
- Prescription and non-prescription medications currently used.

An incident reporting form is included in Attachment C.

16.2 Responsibilities

16.2.1 Construction Health and Safety Officer (HSO)

The HSO is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The HSO is responsible for ensuring the HSM is notified of all incidents, all injuries, near misses, fires, spills, releases, or equipment damage. The HSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can notify OSHA within the required time limit.

16.2.2 Emergency Coordinator

The HSO or their designated alternate will serve as the Emergency Coordinator. The Emergency Coordinator is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. They are also responsible for ensuring the HSM is notified of all incidents, all injuries, near misses, fires, spills, releases, or equipment damage. The Emergency Coordinator is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized).

The Emergency Coordinator must locate emergency phone numbers and identify hospital routes prior to beginning work on the sites. The Emergency Coordinator must make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator is responsible for implementing the Emergency Response Plan.

16.2.3 Site Personnel

Project site personnel are responsible for knowing the Emergency Response Plan and the procedures contained herein. All personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors, will be trained in the Emergency Response Plan.

16.3 Communications

Once an emergency situation has been stabilized, the injured Langan personnel should contact WorkCare - Incident Intervention® at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **973-560-4699** as soon as possible.

16.4 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, the Emergency Notification Numbers (Table 5) will be posted and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Always contact first responders when there are serious or life-threatening emergencies on the site. Project personnel are instructed not to drive injured personnel to the Hospital. In the event of an injury, provide first aid and keep the injured party calm and protected from the elements, and treat for shock when necessary.

16.5 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and each site vehicle.

16.6 Emergency Medical Treatment

The procedures and rules in this CHASP are designed to prevent employee injury. However, if an injury occurs, no matter how slight, it will be reported to the HSO immediately. First-aid equipment will be available on-site at the following locations:

- First Aid Kit: Contractor Vehicles

- Emergency Eye Wash: Contractor Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. First-aid instructions provided from off-site doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely. Only in non-emergency situations may an injured person be transported to an urgent care facility. Due to hazards that may be present at the site and the conditions under which operations are conducted, an emergency may develop. Emergencies can be characterized as injury or acute chemical exposure to personnel, fire or explosion, environmental release, or hazardous weather conditions.

16.8 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of the site investigation activities, including but not limited to fire, explosion, or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

If an emergency arises, the FTL will implement an immediate evacuation of all project personnel due to immediate or impending danger. The FTL will also immediately communicate with the contractor to coordinate any needed evacuation of the property.

The FTL or Site Supervisor will give necessary instructions until the Designated Incident Commander (IC) assumes control. After the emergency has been resolved, the FTL or Site Supervisor will coordinate with the IC and indicate when staff should resume their normal duties. If dangers are present for those at the designated assembly point, another designated location of assembly will be established.

It will be the responsibility of the FTL or Site Supervisor to report a fire or emergency, assess the seriousness of the situation, and initiate emergency measures until the arrival of the local fire fighters or other first responders, should they be necessary. The FTL, working with emergency responders, may also order the closure of the Site for an indefinite period as long as it is deemed necessary.

Under no circumstances will incoming visitors be allowed to proceed to the area of concern once an emergency evacuation has been implemented. Visitors or other persons present in the area of the emergency must be instructed to evacuate the area. The FTL will ensure that access roads

are not obstructed and will remain on-site to provide stand-by assistance upon the arrival of emergency personnel.

If it is necessary to temporarily control traffic in the event of an emergency, those persons controlling traffic will wear proper reflection warning vests until the arrival of police or fire personnel.

16.8.1 Designated Assembly Locations

All personnel will evacuate the site and assemble at a designated assembly location. The assembly location will be designated by Langan personnel and discussed during each shift's pre-job safety briefing.

16.8.2 Accounting for Personnel

All contractor and subcontractor supervisors are responsible for the accounting of all personnel assembled at the designated assembly area. The Designated Incident Commander must be notified if personnel are not found.

16.9 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

16.9.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the HSO.

16.10 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor release is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel must evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations must be monitored for volatile organics.
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator must notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

16.11 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand-wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin must also be rinsed for 15 minutes if contact with caustics, acids, or hydrogen peroxide occurs. Affected items of clothing must also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

16.12 Decontamination during Medical Emergencies

If emergency lifesaving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The HSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe

injury or loss of life to emergency response personnel. For minor medical problems or injuries, normal decontamination procedures will be followed.

16.13 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work will continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The HSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

16.14 Spill Control and Response

All small spills/environmental releases must be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed of. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles must have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment must be inspected prior to being admitted on-site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

The following seven steps must be taken by the Emergency Coordinator:

1. Determine the nature, identity, and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the HSO immediately.
4. Use proper PPE in consultation with the HSO.
5. If a flammable liquid, gas, or vapor is involved, remove all ignition sources, and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with the appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this CHASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan field personnel must notify the project manager when they observe a spill or encounter conditions suggesting one might have occurred.

16.15 Emergency Equipment

The following minimum emergency equipment must be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).

16.16 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies, and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

16.17 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at 1-(800)-9-LANGAN (extension 4699) and the client representative to report the incident or near miss. For emergencies involving personnel injury and/or exposure, the HSO and affected employee will complete and submit an Employee Exposure/Injury Incident Report (Attachment C) to the Langan Corporate Construction Health and Safety Manager as soon as possible following the incident.

17.0 SPECIAL CONDITIONS

This guideline contains information and requirements for special conditions that may not be routinely encountered.

17.1 Scope

The guideline applies to the specific projects identified within this document. Additional provisions will be addressed in each Site-Specific Construction Health and Safety Plan (CHASP), as needed.

17.2 Responsibilities

Site Personnel - All site personnel must be alert to safety hazards on work sites and take action to minimize such hazards. Personnel must utilize the buddy system, watch for inappropriate behavior, and be alerted to changes in site conditions.

Construction Health and Safety Officer (HSO) - The HSO is responsible for considering these procedures in the development of site-specific CHASPs. The HSO must schedule frequent "tail gate" safety briefings to enhance safety awareness and discuss potential problems.

17.3 Procedures

The procedures outlined below must be followed when such conditions are encountered.

17.3.1 Ladders

Langan safety procedures must be used to ensure employee safety when using ladders in the office or work sites. All ladders must be coated or repaired to prevent injury to the employee

from punctures or lacerations and to prevent snagging or clothing. Any wood ladders used must have an opaque covering except for identification or warning labels, which may be placed on one face only of a side rail.

17.3.1.1 Ladder Use

Employees must only use ladders for the purposes they were designed for and must not be used as scaffolding. Ladders will be maintained and inspected prior to use for slip hazards including oil and grease. Employees must use ladders only on stable and level surfaces unless the ladder is secured to prevent displacement. Ladders should not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Ladders should not be used in locations where they could be displaced by workplace activities or traffic. Ladder rungs, cleats and steps must be parallel, level and uniformly spaced when the ladder is in the use position.

Employees should not be carrying anything including equipment that could cause injury if there was a fall while utilizing the ladder. The top and bottom of the ladder area must remain clear while in use. When ascending and descending the ladder, employees must face the ladder.

Ladders must not be loaded beyond the maximum intended load for which they were built or the manufacturer's rated capacity.

17.3.1.2 Portable Ladders

Rungs, cleats, and steps for portable ladders and fixed ladders must be spaced not less than 10 inches apart, nor more than 14 inches apart, as measured between center lines of the rungs, cleats, and steps. When used to access an upper landing surface, the ladder side rails must extend at least three feet above the upper landing surface to which the ladder is used to gain access. If this is not possible, due to the length of the ladder, then the top of the ladder must be secured at its top to a rigid support.

17.3.1.3 Step Stools

Rungs, cleats, and steps of step stools must not be less than 8 inches apart, nor more than 12 inches apart, as measured between center lines of the rungs, cleats, and steps.

17.3.1.4 Extension Ladders

Rungs, cleats, and steps of the base section of extension trestle ladders must be spaced not less than 8 inches apart, nor more than 18 inches apart, as measured between center lines of the rungs, cleats, and steps. The rung spacing on the extension section of the extension trestle

ladder must not be less than 6 inches nor more than 12 inches, as measured between the center lines of the rungs, cleats and steps. Ladders must be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).

17.3.1.5 Inspection

Ladders will be inspected for visible defects periodically, prior to utilization or after any occurrence that could have negatively affected the ladder. Portable ladders with defects including broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty components must not be used. The ladder will be immediately marked as defective, tagged as "Do Not Use" or blocked from being used and removed from service until repaired.

17.3.2 First Aid/Cardiopulmonary Resuscitation (CPR)

Langan field and office personnel will be encouraged to be trained in First Aid and Cardiopulmonary Resuscitation (CPR). Training will be provided free of charge by Langan to all employees. Employees will receive a training certificate that will be kept on file with the Health & Safety Coordinator (HSC). Training and certification will be provided by a credited provider such as American Red Cross or equivalent.

17.3.2.1 Emergency Procedures

Prior to site work, the Langan employees certified in first aid and CPR will be identified in the site-specific CHASP. Langan will endeavor to have at least one employee at a job site trained and able to render first aid and CPR. The site-specific CHASP will contain first aid information on both potential chemical and physical hazards. Emergency procedures to be followed in case of injury or illnesses are provided in the CHASP. The CHASP will include emergency contact information including local police and fire departments, hospital emergency rooms, ambulance services, on-site medical personnel, and physicians. The CHASP will also include directions and contact information for the nearest emergency facility in case immediate medical attention is required. The emergency contact information will be conspicuously posted at the worksite. Employees that are injured and require immediate medical attention must call either 911 or the local posted emergency contacts. Employees should use ambulatory services to transport injured workers to the nearest facility for emergency medical care. In areas where 911 is not available, the telephone numbers of physicians, hospitals, or ambulances must be conspicuously posted.

17.3.2.2 First Aid Supplies

First aid supplies are readily available to all Langan employees when required. First aid kits are located in each Langan office. Portable first aid kits are available for employees to use at work sites. First aid kits should consist of items needed to treat employees for potential chemical and physical injuries. At a minimum, first aid kits should contain items to allow basic first aid to be rendered. Where the eyes or body of an employee may be exposed to corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use including eye wash.

First aid kits will be weatherproof with individually sealed packages of each item. All portable first aid kits must be inspected by Langan employees before and after use to ensure all used items are replaced. When out in the field, employees must check first aid kits weekly to ensure used items are replaced.

17.3.3 Hydrogen Sulfide

Langan employees with the potential to be exposed to hydrogen sulfide while at work sites must have training in hydrogen sulfide awareness. The training will include the identification of areas where employees could be exposed to hydrogen sulfide, health effects, permissible exposure limits, first aid procedures, and personnel protective equipment. Langan employees could be exposed to hydrogen sulfide while at job sites including petroleum refineries, hazardous waste treatment, storage and disposal facilities, uncontrolled hazardous waste sites, and remediation projects.

17.3.3.1 Characteristics

Hydrogen sulfide is a colorless gas with a strong odor of rotten eggs that is soluble in water. Hydrogen sulfide is used to test and make other chemicals. It is also found as a by-product of chemical reactions, such as in sewer treatment. It is a highly flammable gas and a dangerous fire hazard. Poisonous gases are produced in fires including sulfur oxides. Hydrogen sulfide is not listed as a carcinogen.

17.3.3.2 Health Effects

Hydrogen Sulfide can affect employees if inhaled or through contact with skin or eyes. Acute (or short-term) health effects of hydrogen sulfide exposure include irritation of the nose and throat, dizziness, confusion, headache, and trouble sleeping. Inhalation of hydrogen sulfide can irritate the lungs causing coughing and/or shortness of breath. Higher levels of exposure can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic (or long-term) health effects of low levels of exposure to hydrogen sulfide can cause pain and redness of the eyes with blurred vision. Repeated exposure may cause bronchitis with cough, phlegm, and shortness of breath.

17.3.3.3 Protective Clothing and Equipment

Respirators are required for those operations in which employees will be exposed to hydrogen sulfide above OSHA permissible exposure level. The maximum OSHA permissible exposure limit (PEL) for hydrogen sulfide is 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 10 ppm for any 10-minute period.

Where employees are exposed to levels up to 100 parts of hydrogen sulfide vapor per million parts of air (100 ppm), the following types of respiratory protection are allowed:

- Any powered, air-purifying respirator with cartridge(s).
- Any air-purifying, full-facepiece respirator (gas mask) with a chin style, front- or back-mounted canister.
- Any supplied air system with escape self-contained breathing apparatus, if applicable; and,
- Any self-contained breathing apparatus with a full facepiece.

Respirators used by employees must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval. Cartridges or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. Langan employees that have the potential to be exposed to hydrogen sulfide will be trained in the proper use of respirators. Respirator training is discussed under– Langan’s Respiratory Protection Program.

Employees with potential exposure to hydrogen sulfide, or when required by the client, will wear a portable hydrogen sulfide gas detector. The detector should have an audible, visual, and vibrating alarm. The detector may also provide detection for carbon monoxide, sulfur dioxide, and oxygen-deficient atmospheres. The hydrogen sulfide monitor will, at a minimum, be calibrated to detect hydrogen sulfide at a level of 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm). Many portable gas detectors will have factory defaults with a low-level alarm at 10 ppm and a high-level alarm at 15 ppm. Langan employees must consult clients to determine if any site-specific threshold levels exist.

If the hydrogen sulfide gas detector sounds and employees are not wearing appropriate respiratory protection, employees must immediately vacate the area and meet at the assigned

emergency location. Langan employees may not re- enter the site without proper respiratory protection and approval from the client or property owner if needed.

Employees must wear PPE to prevent eye and skin contact with hydrogen sulfide. Employees must wear appropriate protective clothing including boots, gloves, sleeves, and aprons, over any parts of their body that could be exposed to hydrogen sulfide. Non-vented, impact-resistant goggles should be worn when working with or exposed to hydrogen sulfide.

17.3.3.4 Emergency and First Aid Procedures

Eye and Face Exposure

If hydrogen sulfide comes in contact with eyes, it should be washed out immediately with large amounts of water for 30 minutes, occasionally lifting the lower and upper eye lids. Seek medical attention immediately.

Skin Exposure

If hydrogen sulfide contaminates clothing or skin, remove the contaminated clothing immediately and wash the exposed skin with large amounts of water and soap. Seek medical attention immediately. Contaminated clothing should either be disposed of or washed before wearing again.

Breathing

If a Langan employee or other personnel breathe in hydrogen sulfide, immediately get the exposed person to fresh air. If breathing has stopped, artificial respiration should be started. Call for medical assistance or a doctor as soon as possible.

Safety Precautions

Hydrogen sulfide is a highly flammable gas and a dangerous fire hazard. Containers of hydrogen sulfide may explode in a fire situation. Poisonous gases are produced during fires.

Langan employees should contact property owners and operators prior to conducting work onsite to be aware of any site-specific contingency plans, identify where hydrogen sulfide is used at the facility, and be informed about additional safety rules or procedures.

17.3.4 Fire Protection/Extinguishers

Langan field personnel that have been provided with portable fire extinguishers for use at worksites will be trained to familiarize employees with general principles of fire extinguisher use

and hazards associated with the incipient stage of firefighting. Training will be provided prior to the initial assignment for field work and annually thereafter.

Portable fire extinguishers must be visually inspected monthly and subjected to an annual maintenance check. Langan will retain records of the annual maintenance date.

17.3.5 Overhead lines

When field work is performed near overhead lines, the lines must be de-energized and grounded, or other protective measures must be provided before the work commences. If overhead lines are to be de-energized, arrangements must be made with the client, property owner, or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions must prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

When unqualified Langan personnel are working in an elevated position near overhead lines, the location must be such that the person and the longest conductive object they may contact cannot come closer to any unguarded, energized overhead line than the following distances:

1. For voltages to ground 50 kilovolts (kV) or below - 10 feet; and
2. For voltages to ground over 50kV - 10 feet, plus 4 inches for every 10kV over 50kV.

As previously indicated, Langan does not retain qualified employees to perform work on energized equipment.

17.3.5.1 Vehicle and Equipment Clearance

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines must be operated so that a clearance of 10 feet is maintained. If the voltage of the overhead lines is higher than 50kV, the clearance must be increased by 4 inches for every 10kV over that voltage.

If any of the following discussed conditions occur, the clearance may be reduced.

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance must be increased to 4 inches for every 10 kV over that voltage.
- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the

designed working dimensions of the insulating barrier.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless the employee is using protective equipment rated for the voltage, or the equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the overhead line than permitted.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, must be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

17.3.6 Trade Secret

Langan employees could potentially be provided trade secret information by the client or property owner when site-specific information is provided about highly hazardous chemicals. Trade secret means any confidential formula, pattern, process, device, information, or compilation of information that is used in an employer's business, and that allows the employer to obtain an advantage over competitors who do not know or use it. Langan employees understand that this information should be kept confident and if required, may enter into a confidentiality agreement with the client.

17.3.7 Bloodborne Pathogens

Langan employees that can anticipate exposure to blood or other potentially infectious material while at work sites must have training in bloodborne pathogens. Applicable employees would include those trained in first aid and serving a designated role as an emergency medical care provider. Bloodborne pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include but are not limited to, hepatitis B virus and human immunodeficiency virus.

17.3.7.1 Training

Langan employees with potential occupational exposure to blood or other potentially infectious material must participate in a training program. Training must be conducted prior to the initial assignment where there would be potential for exposure and annually thereafter within one year

of previous training. The training program will be provided to Langan employees at no cost to them and during working hours.

Langan will ensure the training program must consist of the following:

- An accessible copy of the regulatory text of 29 CFR 1910.1030 and an explanation of its contents.
- A general explanation of the epidemiology and symptoms of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne pathogens.
- An explanation of Langan's exposure control plan and how the employee can obtain a copy of the written plan.
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- An explanation of the use and limitations of personal protective equipment (PPE) to prevent and reduce exposure.
- Information on the types, proper use, location, removal, handling, and disposal of PPE.
- An explanation of the basis for the selection of PPE.
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge.
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
- Information on the post-exposure evaluation and determining whether the employer is required to provide for the employee following an exposure incident.
- An explanation of the signs and labels and/or color coding required by paragraph 29 CFR 1910.1030(g)(1); and
- An opportunity for interactive questions and answers with the person conducting the training session.

Langan will develop and implement a written Exposure Control Plan, which will be designed to eliminate or minimize employee exposure to bloodborne pathogens. The Exposure Control Plan will contain the following elements:

- An exposure determination for employees.
- The schedule and method of implementation for Methods of Compliance (29 CFR 191.1030(d)), Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up (29 CFR 1910.1030(f)), Communication of Hazards to Employees (29 CFR 1910.1030(g)) and

(h) Recordkeeping (29 CFR 1910.1030(h)).

- The procedure for the evaluation of circumstances surrounding exposure incidents.
- Ensure a copy of the Exposure Control Plan will be accessible to employees; and,
- The Exposure Control Plan must be reviewed and updated at least annually.

Langan employees with occupational exposure to bloodborne pathogens include any employees trained in first aid that would be expected to provide emergency medical care. This determination is made without regard to the use of PPE, which could eliminate or minimize exposure.

Universal precautions must be observed to prevent contact with blood or other potentially infectious materials. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for bloodborne pathogens. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids must be considered potentially infectious materials.

Work practice controls must be used to eliminate or minimize employee exposure, if applicable. Since Langan employees will have occupational exposure only during the rendering of first aid, personnel protective equipment will be utilized to reduce or minimize exposure. PPE that could be available to Langan personnel when administering first aid includes safety glasses, gloves, and Tyvek suits or sleeves. PPE and first aid kits will be provided to employees at no cost to them.

Langan employees that render first aid in office areas will have access to hand-washing facilities or restrooms. For first aid rendered at field locations, first aid kits will contain an appropriate antiseptic hand cleanser and clean cloth/paper towels or antiseptic towelettes. After using antiseptic hand cleansers or towelettes, employees must wash their hands with soap and running water as soon as feasible.

After administering first aid, potentially infectious materials, including towels, personnel protective equipment, clothes, and bandages, must be placed in a container, which prevents leakage during collection, handling, processing, storage, transport, or shipping. All PPE will be disposed of after use. Any equipment or working surfaces which was been exposed to blood or potentially infectious materials due to an injury will be decontaminated prior to reuse.

Langan will make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident. These services will be available to the employee at no cost to them through a medical provider.

17.3.7.2 Recordkeeping

Langan will maintain training and medical records for each employee with occupational exposure to blood or potentially infectious materials. Medical and training records will be maintained by Langan's H&S Department.

Training records will include the following:

- Dates of the training sessions.
- Contents or a summary of the training sessions.
- Names and qualifications of persons conducting the training; and
- Names and job titles of all persons attending the training sessions.

Training records must be maintained for 3 years from the date on which the training occurred. Medical records will be preserved and maintained for the duration of employment plus 30 years.

All records will be made available upon request to employees, the Assistant Secretary of Labor for Occupational Safety and Health, and the Director of the National Institute for Occupational Safety and Health Director of OSHA for examination and copying. Medical records must have written consent from the employee before releasing.

If Langan ceases to do business, all records must be transferred to the successor employer. The successor employer must receive and maintain these records.

If there will not be a successor, Langan will notify current employees of their rights to access records at least three months prior to the cessation of business.

18.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports, and recordkeeping.

18.1 Field Change Authorization Request

Any changes to the work to be performed that are not included in the CHASP will require an addendum that is approved by the Langan project manager and Langan HSM to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

18.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day on-the-job training (OJT)), and respirator fit-test records) and medical clearance for site work and respirator use will be maintained in the office and available upon request. Records

for all subcontractor employees must also be available upon request. All employee medical records will be maintained by the HSM.

18.3 Onsite Log

A log of personnel on-site each day will be kept by the HSO or designee.

18.4 Daily Safety Meetings (“Tailgate Talks”)

Completed safety briefing forms will be maintained by the HSO.

18.5 Exposure Records

All personal monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be maintained by the HSO during site work. At the end of the project, they will be maintained according to 29 CFR 1910.1020.

18.6 Hazard Communication Program/MSDS-SDS

Material safety data sheets (MSDS) Safety Data Sheets (SDS) have been obtained for applicable substances and are included in this CHASP (Attachment D). Langan’s written hazard communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSM.

18.7 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan incident/injury hotline at 1-800-952-6426, extension 4699, and the Project Manager to report the incident or near miss. The Project Manager will contact the client or client representative. A written report must be completed and submitted HSM within 24 hours of the incident. For emergencies involving personnel injury and/or exposure, the employee will complete and submit the Langan incident/injury report to the Langan corporate health and safety manager as soon as possible following the incident. Accidents will be investigated in-depth to identify all causes and to recommend hazard control measures.

18.7.1 Accident and Injury Report Forms

18.7.1.1 Accident/Incident Report

All injuries, no matter how slight, must be reported to the FTL and the PM immediately. The accident/incident report forms, attached in Attachment C, will be filled out on all accidents by the applicable contractor supervision personnel, the FTL, or the HSO. Copies of all accident/incident

reports must be kept on-site and available for review. Project personnel will be instructed on the location of the first aid station, hospital, and doctor and ambulance service near the job. The emergency telephone numbers will be conspicuously posted in site vehicles near the work zone. First aid supplies will be centrally located and conspicuously posted between restricted and nonrestricted areas to be readily accessible to all on the site.

18.7.1.2 First Aid Treatment Record

The forms will be used for recording all non-lost time injuries treated by the project first-aid attendant, the local physician or hospital will be entered in detail on this record. "Minor" treatment of scratches, cuts, etc. will receive the same recording attention as treatment of more severe injuries.

18.7.1.3 OSHA Form 300

An OSHA Form 300 will be kept at the Langan Corporate Office in Parsippany, New Jersey. All recordable injuries or illnesses will be recorded on this form. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The Incident Report form used to capture the details of work-related injuries/illnesses meets the requirements of the OSHA Form 301 (supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses. Forms for recording OSHA work-related injuries and illnesses are included in Attachment C.

19.0 CONFINED SPACE ENTRY

Confined spaces are not anticipated at the Site during planned construction activities. If confined spaces are identified, the contractor must implement their own confined space program that all applicable federal, state, and local regulations. Confined spaces **will not** be entered by Langan personnel.

20.0 CHASP ACKNOWLEDGEMENT FORM

All Langan personnel and contractors will sign this CHASP Compliance Agreement indicating that they have become familiar with this CHASP and that they understand it and agree to abide by it.

368 Ninth Avenue, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com

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TABLES

TABLE 1
TASK HAZARD ANALYSES

Task	Hazard	Description	Control Measures	First Aid
1.3.1 – 1.3.21	Contaminated Soil or Groundwater- Dermal Contact	Contaminated water spills on skin, splashes in eyes; contact with contaminated soil/fill during construction activities or sampling.	Wear proper PPE; follow safe practices, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.21	Lacerations, abrasions, punctures	Cutting bailer twine, pump tubing, acetate liners, etc. with knife; cuts from sharp site objects or previously cut piles, tanks, etc.; Using tools in tight spaces	Wear proper PPE; follow safe practices	Clean wound, apply pressure and/or bandages; seek medical attention as required.
1.3.1 – 1.3.21	Contaminated Media Inhalation	Opening drums, tanks, wells; vapors for non-aqueous phase liquids or other contaminated site media; dust inhalation during excavation; vapor accumulation in excavation	Follow air monitoring plan; have quick access to respirator, do not move or open unlabeled drums found at the site, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.21	Lifting	Improper lifting/carrying of equipment and materials causing strains	Follow safe lifting techniques. Langan employees are not to carry contractor equipment or materials	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.21	Slips, trips, and falls	Slips, trips, and falls due to uneven surfaces, cords, steep slopes, debris, and equipment in work areas	Good housekeeping at site; constant awareness and focus on the task; avoid climbing on stockpiles; maintain safe distance from construction activities and excavations; avoid elevated areas over six feet unless fully accredited in fall protection and wearing an approved fall protection safety apparatus	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.21	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from construction activities	Seek medical attention as required
1.3.1 – 1.3.21	Falling objects	Soil material, tools, etc. dropping from drill rigs, front-end loaders, etc.	Hard hats to be worn at all times while in work zones; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.21	Underground/ overhead utilities	Excavation equipment, drill rig auger contacts underground object; boom touches overhead utility	"One Call" before dig; follow safe practices; confirm utility locations with contractor; wear proper PPE; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.21	Insects (bees, wasps, hornet, mosquitoes, and spider)	Sings, bites	Insect Repellent; wear proper protective clothing (work boots, socks, and light-colored pants); field personnel who may have insect allergies (e.g., bee sting) should provide this information to the HSO or FSO prior to commencing work and will have allergy medication on site.	Seek medical attention as required
1.3.1 – 1.3.21	Vehicle traffic / Heavy Equipment Operation	Vehicles unable to see workers on site, operation of heavy equipment in tight spaces, equipment failure, malfunctioning alarms	Wear proper PPE, especially visibility vest; use a buddy system to look for traffic; rope off area of work with cones and caution tape or devices at points of hazard, maintain safe distance from construction activities and equipment	Seek medical attention as required

TABLE 2
CONTAMINANT HAZARDS OF CONCERN

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	1,1,2-Trichloro-1,2,2-trifluoroethane Chlorofluorocarbon-113 CFC-113 Freon® 113 Genetron® 113 Halocarbon 113 Refrigerant 113 TTE Frigen 113 TR Freon TF Trichlorotrifluoroethane	76-13-1	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation skin, throat, drowsiness, dermatitis; central nervous system depression; dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite. In animals: cardiac arrhythmias, narcosis,	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	1,1'-Biphenyl 1,1-Biphenyl Biphenyl Phenyl benzene Diphenyl	92-52-4	None	1 mg/m ³ 100 mg/m ³	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, throat; headache, nausea, lassitude (weakness, exhaustion), numb limbs; liver damage	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	1,2,4,5-Tetramethylbenzene Durene	95-93-2	NA	None None	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	1,2,4-Trichlorobenzene Unsym-Trichlorobenzene 1,2,4-Trichlorobenzol	120-82-1	NA	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, skin, mucous membrane; In Animals: liver, kidney damage; possible teratogenic effects	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	1,2,4-Trimethylbenzene	95-63-6	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	1,2-Dichlorobenzene o-DCB	95-50-1	PID	50 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eye, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	1,3,5-Trimethylbenzene Mesitylene sym-Trimethylbenzene	108-67-8	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	1,3-Butadiene Biethylene Biviny Butadiene Divinyl Erythrene Vinylethylene	106-99-0	PID	1 ppm 2000 ppm	Vapor	inhalation, skin, and/or eye contact (liquid)	irritation to the eyes, nose, throat; drowsiness, dizziness; liquid: frostbite; teratogenic, reproductive effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.21	1,3-Dichlorobenzene m-Dichlorobenzol; m-Phenylene dichloride m-dichlorobenzene m-DCB	541-73-1	PID	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	1,4-Dichlorobenzene para-Dichlorobenzene p-Dichlorobenzene 1,4-Dichlorobenzene 1,4-DCB para-Dichlorobenzene p-Dichlorobenzene p-DCB PDB Paramoth Para crystals Paracide Dichlorocide	106-46-7	PID	75 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	1-Methylnaphthalene alpha-Methylnaphthalene alpha-Methylnaftalen	90-12-0	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, respiratory system	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	2,2,4-Trimethylpentane Isooctane iso-Octane	540-84-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	2-Butanone Ethyl methyl ketone MEK Methyl acetone Methyl ethyl ketone	78-93-3	PID	200 ppm 3000 ppm	Soil Groundwater Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eye: Irrigate immediately Skin: Water wash immediately Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	2-Hexanone Butyl methyl ketone MBK Methyl butyl ketone Methyl n-butyl ketone	591-78-6	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	2-Methylnaphthalene β-methylnaphthalene	91-57-6	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion or skin absorption, eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract. It may also cause headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	4,4'-DDD Dichlorodiphenyldichloroethane 1,1'-(2,2-Dichloroethylidene)bis (4-chlorobenzene) p,p'-DDD	72-54-8	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	4-Isopropyltoluene 1-Methyl-4-(1-methylethyl)benzene 4-Isopropyltoluene; 4-Methylcumene; 1-Methyl-4-isopropylbenzene Dolcymene Camphogen Paracymene Cymene p-Cymene p-Isopropyltoluene	99-87-6	PID	NA NA	Soil Groundwater Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	4-Methyl-2-pentanone Hexone Isobutyl methyl ketone Methyl isobutyl ketone MIBK	108-10-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Acenaphthene 1,2-Dihydroacenaphthylene 1,8-Ethylenenaphthalene peri-Ethylenenaphthalene Naphthyleneethylene Tricyclododecapentaene	83-32-9	PID	NA NA	Soil	inhalation, ingestion, skin and/or eye contact,	irritation to the skin, eyes, mucous membranes and upper respiratory tract; If ingested, it can cause vomiting	Eye: Irrigate immediately Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.21	Acenaphthylene Cyclopental(de)naphthalene, Acenaphthalene	208-96-8	PID	NA NA	Soil	inhalation, ingestion, skin and/or eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Acetone Dimethyl ketone Ketone propane 2-Propanone	67-64-1	PID	1000 ppm 2500 ppm	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Acetophenone 1-phenylethanone Methyl phenyl ketone Phenylethanone	98-86-2	None	NA NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.21	Aldrin 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo-1,4-exo-5,8-dimethanonaphthalene HHDN Octalene	309-00-2	PID	0.25 ppm 5 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort); myoclonic jerks of limbs; clonic, tonic convulsions; coma; hematuria (blood in the urine), azotemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Alpha-BHC alpha-Hexachlorocyclohexane -alpha,2-alpha,3-beta,4-alpha,5-beta,6-beta- Hexachlorocyclohexane alpha-1,2,3,4,5,6- Hexachlorocyclohexane alpha-Benzenehexachloride α-1,2,3,4,5,6- hexachlorocyclohexane α-HCH α-Benzenehexachloride alpha-hexacloran(e) alpha-Lindane Alpha Hexachlorocyclohexane	319-84-6	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane possible carcinogenic, effects to liver, blood, and central nervous system	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Alpha-Chlordane Alpha Chlordane a-Chlordane	5103-71-9	None	0.5 mg/m ³ 100 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Aluminum	7429-90-5	None	0.5 mg/m ³ 50 mg/m ³	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.21	Anthracene	120-12-7	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to the skin, eyes, mucous membranes and upper respiratory tract, abdominal pain if ingested.	Eye: Irrigate immediately, seek medical attention immediately Skin: Soap wash immediately, Breathing: Move to fresh air, refer to medical attention; Swallow: refer to medical attention

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Antimony	7440-36-0	None	0.5 mg/m ³ 50 mg/m ³	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation skin, possible dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Aroclor 1242	53469-21-9	None	0.5 mg/m ³ 5 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Aroclor 1248	12672-26-6	None	0.5 mg/m ³ 5 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Aroclor 1254	11097-69-1	None	0.5 mg/m ³ 5 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Aroclor 1260	11096-82-5	None	0.5 mg/m ³ 5 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Arsenic	NA	None	0.5 mg/m ³ NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation skin, possible dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Barium	10022-31-8	None	0.5 mg/m ³ 50 mg/m ³	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper respiratory system; skin, burns; gastroenteritis; muscle spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Benzene Benzol Phenyl hydride Alkyl benzene isomers	71-43-2	PID	3.19 mg/m ³ 1,595 mg/m ³	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Benzo(a)anthracene Benzanthrane 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately; Breathing: move to fresh air; Swallow: Induce vomiting if conscious, seek medical attention immediately
1.3.1 – 1.3.21	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	NA	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	Benzyl Alcohol Benzenemethanol Phenyl carbinol alpha-Hydroxytoluene Benzoyl alcohol Phenyl methanol	100-51-6	PID	NA NA	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Benzyl butyl phthalate Butyl benzyl phthalate Butylbenzylphthalate	86-66-7	None	NA NA	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	Beryllium	7440-41-7	None	0.002 mg/m ³ 4 mg/m ³	Soil	inhalation, skin and/or eye contact	berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation to the eyes; dermatitis; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.21	Bis(2-chloroethyl)ether Dichloroethyl ether 2,2'-Dichlorodiethyl ether 2,2'-Dichloroethyl ether Bis(2-Chloroethyl) Ether 2-Chloroethyl Ether Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	PID	15 ppm 100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Bis(2-ethylhexyl)phthalate Bis(2-Ethylhexyl) Phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate bis(2-ethylexyl)phthalate	117-81-7	None	5 mg/m ³ 5000 mg/m ³	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	BTEX Benzene, Toluene, Ethylbenzene M-Xylene, O-Xylene And P-Xylene; BTEX I; BTEX II; BTEX Mixture I; BTEX Mixture II; BTEX Stock Standard Total BTEX	NA	PID	3.19 mg/m ³ 1,595 mg/mg ³	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Cadmium	7440-43-9	None	0.005 mg/m ³ 9 mg/m ³	Soil	inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Calcium	7440-70-2	None	NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper resp tract; ulcer, perforation nasal septum; pneumonitis; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Carbazole 9-azafluorene Dibenzopyrrole Diphenylenimine diphenyleneimide	86-74-8	None	NA NA	Soil	inhalation, skin absorption (liquid), skin, and/or eye contact	irritation to eyes and skin, respiratory irritation	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	Carbon disulfide	75-15-0	PID	20 ppm 500 ppm	Soil Groundwater Vapor	inhalation, skin or eye contact, ingestion	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support
1.3.1 – 1.3.21	Chlordane Chlordan Chlordano 1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane Total Chlordane	57-74-9	None	0.5 mg/m ³ 100 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Chloride	16887-00-6	None	1 ppm 10 ppm	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Chlorobenzene benzene chloride monochlorobenzene Phenyl chloride Chlorobenzol MCB	108-90-7	PID	75 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin or eye contact, ingestion	irritation to the eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Chloroform Methane trichloride Trichloromethane Chloro-3-methyl phenol	67-66-3	None	50 ppm 500 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Chromium Total Chromium Chromium, Total	7440-47-3	None	1.0 mg/m ³ 250 mg/m ³	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eye, skin, and respiratory, gastrointestinal irritation nausea, vomit, diarrhea [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Coal Tar Pitch Coal Tar Pitch Volatiles	80007-45-2 65996-93-2	None	0.1 mg/m ³ 80 mg/m ³	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Remove to fresh air, Swallow: Medical attention immediately
1.3.1 – 1.3.21	Cobalt	7440-48-4	None	0.1mg/m ³ 20 mg/m ³	Soil	inhalation, ingestion, skin, and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Copper	7440-50-8	None	1.0 mg/m ³ 100 mg/m ³	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, metallic taste; dermatitis; anemia	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Cumene Cumol Isopropylbenzene 2-Phenyl propane 1-methylethyl benzene Isopropyl Benzene	98-82-8	PID	50 ppm 900 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Cyanide	57-12-5	None	5 mg/m ³ 25 mg/m ³	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	Exposure to cyanide can cause weakness, headaches, confusion, dizziness, fatigue, anxiety, sleepiness, nausea and vomiting. Breathing can speed up then become slow and gasping. Coma and convulsions also occur. If large amounts of cyanide have been absorbed by the body, the person usually collapses and death can occur very quickly. Long-term exposure to lower levels of cyanide can cause skin and nose irritation, itching, rashes and thyroid changes.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Cyclohexane Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene	110-82-7	PID	300 ppm 1300 ppm	Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	DDE 4,4-DDE 4,4'-DDE 1,1-bis-(4-chlorophenyl)-2,2-dichloroethene Dichlorodiphenyldichloroethene p,p'-DDE	72-55-9	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	Oral ingestion of food is the primary source of exposure for the general population. Acute and chronic ingestion may cause nausea, vomiting, diarrhea, stomach pain, headache, dizziness, disorientation, tingling sensation, kidney damage, liver damage, convulsions, coma, and death. 4,4' DDE may cross the placenta and can be excreted in breast milk	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	DDT 4,4-DDT 4,4'-DDT p,p'-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	50-29-3	None	1 mg/m ³ 500 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Dibenz(a,h)anthracene Dibenzo(a,h)anthracene Dibenzo[a,h]anthracene	53-70-3	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support PID Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Dibenzofuran	132-64-9	None	NA NA	Soil	inhalation, absorption	irritation to eyes, and skin	Eyes: Irrigate immediately Skin: Soap wash promptly.
1.3.1 – 1.3.21	Dibutyl phthalate Di-n-butyl phthalate Butyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid dibutyl ester o-Benzenedicarboxylic acid dibutyl ester DBP Palatinol C, Elaol Dibutyl-1,2-benzene-dicarboxylate Di-n-butylphthalate	84-74-2	None	5 mg/m ³ 4000 mg/m ³	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluoromethane	75-71-8	None	1000 pp, 15,000 ppm	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.21	Dieldrin HEOD 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-exo-5,8-dimethanonaphthalene	60-57-1	PID	0.25 mg/m ³ 50 mg/m ³	Groundwater Soil Water	inhalation, skin absorption, ingestion, skin and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Diesel Fuel automotive diesel fuel oil No. 2 distillate diesoline diesel oil diesel oil light diesel oil No. 1-D summer diesel	68334-30-5	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Di-n-octyl phthalate Di-n-cotylphthalate Di-n-octylphthalate Di-sec octyl phthalate Dioctyl phthalate DEHP, Di(2-ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)phthalate, Octyl phthalate	117-84-0	None	5 mg/m ³ 5000 mg/m ³	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Endosulfan sulfate 1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dimethanol, cyclic sulfate 6,7,8,9,10,10-hexachloro-1,5,5a,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin-3,3-dioxide	1031-07-8	None	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	Hypersensitive to stimulation, sensation of prickling, tingling, or creeping on skin. Headache, dizziness, nausea, vomiting, incoordination, tremor, mental confusion, hyperexcitable state. In severe cases: convulsions, seizures, coma, and respiratory depression.	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Ethanol Absolute alcohol Alcohol cologne spirit drinking alcohol ethane monoxide ethylic alcohol EtOH ethyl alcohol ethyl hydrate ethyl hydroxide ethylol grain alcohol hydroxyethane methylcarbinol	64-17-5	PID	1000 ppm 3300 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose; headache, drowsiness, lassitude (weakness, exhaustion), narcosis; cough; liver damage; anemia; reproductive, teratogenic effects	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-41-4	PID	435 mg/m ³ 3,472 mg/m ³	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Fluoranthene Benzo(j,k)fluorene	206-44-0	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Fluorene	86-73-7	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention
1.3.1 – 1.3.21	Fuel Oil No. 2	68476-30-2	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	gamma-Chlordane Gamma Chlordane γ-Chlordane	5566-34-7	None	0.5 mg/m ³ 100 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Gasoline	8006-61-9	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.21	Heptachlor epoxide 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	1024-57-3	None	0.5 mg/m ³ 35 mg/m ³	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Goundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Hexavalent Chromium Chromium VI Chromium, Hexavalent	18540-29-9	None	1.0 mg/m ³ 250 mg/m ³	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Indeno(1,2,3-cd)pyrene Indeno(1,2,3-c,d)Pyrene Indeno[1,2,3-cd]Pyrene	193-39-5	None	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately, wash mouth with water
1.3.1 – 1.3.21	Iron	7439-89-6	None	10 mg/m ³ NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Isopropyl alcohol Iso-Propyl Alcohol Carbinol IPA Isopropanol 2-Propanol sec-Propyl alcohol Rubbing alcohol Isopropylalcohol	67-63-0	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Lead	7439-92-1	None	0.050 mg/m ³ 100 mg/m ³	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to the eyes; hypertension	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Magnesium	7439-95-4	None	15 mg/m ³ NA	Soil	inhalation, skin and/or eye contact	irritation to the eyes, skin, respiratory system; cough	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.21	Manganese	7439-96-5	None	5 mg/m ³ 500 mg/m ³	Groundwater Soil	inhalation, ingestion	aerosol is irritating to the respiratory tract	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	m-Cresol meta-Cresol 3-Cresol m-Cresylic acid 1-Hydroxy-3-methylbenzene 3-Hydroxytoluene 3-Methylphenol 3-Methylphenols	108-39-4	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Mercury	7439-97-6	None	0.1 mg/m ³ 10 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Methyl Chloride Chloromethane Monochloromethane Refrigerant-40 R-40	74-87-3	NA	100 ppm 2000 ppm	Groundwater Soil	inhalation, skin, and/or eye contact	dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; liquid: frostbite; reproductive, teratogenic effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.21	Methyl chloroform Chloroethene 1,1,1-Trichloroethane 1,1,1-Trichloroethane-(stabilized) 1,1,1-TCA 1,1,1-Trichloroethane TCA	71-55-6	PID	350 ppm 700 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Methylene Chloride Dichloromethane Methylene dichloride	75-09-2	PID	25 ppm 2300 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	m-Xylenes 1,3-Dimethylbenzene m-Xylol Metaxylene	108-38-3 179601-23-1	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m ³ 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; hematuria (blood in the urine); dermatitis, optical neuritis	Eye: Irrigate immediately Skin: Molten flush immediately/solid-liquid soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	n-Butylbenzene Butylbenzene 1-phenylbutane	104-51-8	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	n-Hexane Hexane, Hexyl hydride, normal-Hexane	110-54-3	PID	500 ppm 1100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Nickel	7440-02-0	None	NA 10 mg/m ³	Groundwater Soil	ion, ingestion, skin and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	N-Nitrosodiphenylamine NDFA	86-30-6	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Methane Hydrogen Sulfide Carbon Monoxide Nitrogen	7782-44- 7 74-82-8 7783-08- 4 830-08-0 7727-37- 9	Multi-Gas PID	NA/NA NA/NA 10/100 ppm 50/1200 ppm NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.21	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Isobutylene Nitrogen	7782-44- 7 115-11-7 7727-37- 9	PID	NA/NA NA/NA NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.21	n-Propylbenzene Isocumene Propylbenzene 1-Phenylpropane 1-Propylbenzene Phenylpropane Propylbenzene-n	103-65-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	o-Xylenes 1,2-Dimethylbenzene ortho-Xylene o-Xylol	95-47-6 179601-23-1	PID	100 ppm 900 ppm	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	p-Cresol para-Cresol 4-Cresol p-Cresylic acid 1-Hydroxy-4-methylbenzene 4-Hydroxytoluene 4-Methylphenol 4-Methylphenols	106-44-5	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	p-Diethylbenzene 1,4-Diethylbenzene 1,4-Diethyl benzene	105-05-5	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; skin, burns; in animals: central nervous system depression	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	p-Ethyltoluene 4-Ethyltoluene 1-ethyl-4-methyl-benzene 1-methyl-4-ethylbenzene	622-96-8	NA	NA NA	Soil	ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Phenanthrene	85-01-8	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	Phenol Carbolic acid Hydroxybenzene, Monohydroxybenzene Phenyl alcohol Phenyl hydroxide	108-95-2	PID	5 ppm 250 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine, skin burns; dermatitis; tremor, convulsions, twitching	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Potassium	7440-09-7	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact inhalation, ingestion, skin, and/or eye contact	eye: Causes eye burns. Skin: Causes skin, burns. Reacts with moisture in the skin, to form potassium hydroxide and hydrogen with heat. ingestion: Causes gastrointestinal tract burns. inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. inhalation may be fatal because of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.	Eyes: Get medical aid immediately Skin: Get medical aid immediately. Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Ingestion: If victim is conscious and alert, give 2-4 full cups of milk or water. Get medical aid immediately. inhalation: Get medical aid immediately.
1.3.1 – 1.3.21	p-Xylenes 1,4-Dimethylbenzene para-Xylene p-Xylol	106-42-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m ³ 80 mg/m ³ (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.21	sec-Butylbenzene 2-phenylbutane	135-98-8	PID	10 ppm 100 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat. inhalation: nausea or vomiting	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Selenium	7782-49-2	None	1 mg/m ³ 0.2 mg/m ³	Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Silver	7440-22-4	None	0.01mg/ m ³ 10 mg/m ³	Soil	inhalation, ingestion, skin, and/or eye contact	blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Sodium	7440-23-5	None	NA NA	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Styrene Ethenyl benzene Phenylethylene Styrene monomer Styrol Vinyl benzene	100-42-5	PID	100 ppm 700 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; possible liver injury; reproductive effects	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Tert-Butyl Alcohol Tertiary Butyl Alcohol Tert-Butanol Butyl alcohol 2-Methyl-2-propanol Trimethyl carbinol Tert-Butyl Alcohol TBA	75-65-0	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; drowsiness, narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	tert-Butylbenzene t-Butylbenzene 2-Methyl-2-phenylpropane Pseudobutylbenzene	98-06-6	PID	10 ppm NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	eye, skin, irritation; dry nose, throat; headaches; low blood pressure, tachycardia; abnormal cardiovascular system; central nervous system depression; hematopoietic depression	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Tetrachloroethylene Perchloroethylene Perchloroethylene PCE Perk Tetrachloroethylene Tetrachloroethene	127-18-4	PID	100 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Thallium	7440-28-0	None	0.1 mg/m ³ 15 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Toluene Methyl benzene Methyl benzol Phenyl methane Toluol	108-88-3	PID	200 ppm 500 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, paresthesia; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Total PCBs Chlorodiphenyl (42% chlorine) Aroclor® 1242 PCB Polychlorinated biphenyl	53469-21-9	None	0.5 mg/m ³ 5 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Total Petroleum Hydrocarbons TPH	143-07-7	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Total Petroleum Hydrocarbons TPH	143-07-7	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Total Xylenes Dimethylbenzene Xylol	1330-20-7	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Trans-Chlordane	5103-74-2	None	0.5 mg/m ³ 100 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Trichloroethylene Trichloroethenylenes Ethylene trichloride TCE Trichloroethene Trilene	79-01-6	PID	100 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Trichlorofluoromethane Fluorotrichloromethane Freon® 11 Monofluorotrichloromethane Refrigerant 11 Trichloromonofluoromethane Freon 11	75-69-4	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Trivalent Chromium Chromium III Chromium, Trivalent	NA	None	1.0 mg/m ³ 250 mg/m ³	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.21	Vanadium	7440-62-2	None	0.1 mg/m ³ 15 mg/m ³	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Volatile Organic Compounds VOCs	NA	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.21	Zinc	7440-62-2	None	15 mg/m ³ 500 mg/m ³	Groundwater Soil	inhalation	chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Breathing: Respiratory support

EXPLANATION OF ABBREVIATIONS

PID = Photoionization Detector

PEL = Permissible Exposure Limit (8-hour Time Weighted Average)

IDLH = Immediately Dangerous to Life and Health

ppm = part per million

mg/m³ = milligrams per cubic meter

500 mg/m³

TABLE 3
SUMMARY OF MONITORING EQUIPMENT

Instrument	Operation Parameters
Photoionization Detector (PID)	<p>Hazard Monitored: Many organic and some inorganic gases and vapors.</p> <p>Application: Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is measured.</p> <p>Detection Method: Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions.</p> <p>General Care/Maintenance: Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories.</p> <p>Typical Operating Time: 10 hours. 5 hours with strip chart recorder.</p>
Oxygen Meter	<p>Hazard Monitored: Oxygen (O₂).</p> <p>Application: Measures the percentage of O₂ in the air.</p> <p>Detection Method: Uses an electrochemical sensor to measure the partial pressure of O₂ in the air and converts the reading to O₂ concentration.</p> <p>General Care/Maintenance: Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to expiration of the specified interval. If the ambient air is less than 0.5% C O₂, replace the detector cell frequently.</p> <p>Typical Operating Time: 8 – 12 hours.</p>
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI)	<p>Hazard Monitored: Combustible gases and vapors.</p> <p>Application: Measures the concentration of combustible gas or vapor.</p> <p>Detection Method: A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present.</p> <p>General Care/Maintenance: Recharge or replace battery. Calibrate immediately before use.</p> <p>Typical Operating Time: Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.</p>
Flame Ionization Detector (FID) with Gas Chromatography Option (i.e., Foxboro Organic Vapor Analyzer (OVA))	<p>Hazard Monitored: Many organic gases and vapors (approved areas only).</p> <p>Application: In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated.</p> <p>General Care/Maintenance: Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks.</p> <p>Typical Operating Time: 8 hours; 3 hours with strip chart recorder.</p>
Portable Infrared (IR) Spectrophotometer	<p>Hazard Monitored: Many gases and vapors.</p> <p>Application: Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures.</p> <p>Detection Method: Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound.</p> <p>General Care/Maintenance: As specified by the manufacturer.</p>

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	<p>Hazard Monitored: Specific gas and vapors.</p> <p>Application: Measures concentration of specific gases and vapors.</p> <p>Detection Method: The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration.</p> <p>General Care/Maintenance: Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration dates of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.</p>
Aerosol Monitor	<p>Hazard Monitored: Airborne particulate (dust, mist, fume) concentrations.</p> <p>Application: Measures total concentration of semi-volatile organic compounds, PCBs, and metals.</p> <p>Detection Method: Based on light-scattering properties of particulate matter. Using an internal pump, air sample is drawn into the sensing volume where near infrared light scattering is used to detect particles.</p> <p>General Care/Maintenance: As specified by the mfr. Also, the instrument must be calibrated with particulates of a size and refractive index similar to those to be measured in the ambient air.</p>
Monitox	<p>Hazard Monitored: Gases and vapors.</p> <p>Application: Measures specific gases and vapors.</p> <p>Detection Method: Electrochemical sensor specific for the chemical species in question.</p> <p>General Care/Maintenance: Moisten sponge before use; check the function switch; change the battery when needed.</p>
Gamma Radiation Survey Instrument	<p>Hazard Monitored: Gamma Radiation.</p> <p>Application: Environmental radiation monitor.</p> <p>Detection Method: Scintillation detector.</p> <p>General Care/Maintenance: Must be calibrated annually at a specialized facility.</p> <p>Typical Operating Time: Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.</p>

TABLE 4
INSTRUMENTATION ACTION LEVELS

Photoionization Detector Action Levels	Action Required
Background to 5 parts per million (ppm) ¹	No respirator needed; no further action
>5ppm but \leq 15 ppm at the perimeter of the work area	<ul style="list-style-type: none"> • Work temporarily halted and monitoring continues. • If instantaneous readings decrease below 5 ppm above background, work activities will resume with continued monitoring
>5ppm but \leq 25 ppm at the downwind perimeter of the hot zone	<ul style="list-style-type: none"> • Work activities will be halted. • Source of vapors identified. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators and work can resume if vapor levels 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential or commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average
>25ppm at the parameter of the hot zone	Activities will shut down

Particulate Monitoring Action Levels	Action Required
Background to 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) ² , no dust observed	No further action
Background to 100 $\mu\text{g}/\text{m}^3$, dust observed leaving the work area	Dust suppression must be employed.
100 to 150 $\mu\text{g}/\text{m}^3$ at the downwind parameter of the hot zone	<ul style="list-style-type: none"> • Work activities will be halted. • Source of dust identified. • Dust suppression activities initiated. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators. • Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 $\mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.
>150 $\mu\text{g}/\text{m}^3$ at the parameter of the hot zone	Activities will shut down

¹ VOC concentrations are 15-minute averages above site background (upwind parameter)

² Particulate concentrations are 15-minute averages above site background (upwind parameter)

TABLE 5
EMERGENCY NOTIFICATION LIST

ORGANIZATION	CONTACT	TELEPHONE
Local Police Department		911
Local Fire Department		911
Ambulance/Rescue Squad		911
Hospital	New York City Health and Hospitals/Coney Island	911 or 718-616-3000
Langan Incident Hotline		800-952-6426 extension 4699
Medical Treatment Hotline	WorkCare™	911 or 888-449-7757
Langan Environmental Project Manager	Elizabeth Adkins	803-381-5282 (cell)
Langan Site/Civil Project Manager	Brian Conway	716-796-4184 (cell)
Langan Construction Health and Safety Manager (HSM)	Tony Moffa	215-756-2523 (cell)
Langan Health & Safety Officer (HSO)	William Bohrer	410-984-3068 (cell)
Langan Field Team Leader (FTL)	To Be Determined	
Client's Representative	Brett Richer	415-394-9000
National Response Center (NRC)		800-424-8802
Chemical Transportation Emergency Center (Chemtrec)		800-424-9300
Center for Disease Control (CDC)		404-639-3534
EPA (RCRA Superfund Hotline)		800-424-9346
TSCA Hotline		202-554-1404
Poison Control Center		800-222-1222

Immediately following an injury, unless immediate emergency medical treatment is required, the injured employee must contact WorkCare - Incident Intervention® at 888-449-7787.

For all other incidents or near misses, unless emergency response is required, either the employee or a coworker must contact the Langan Incident Hotline at 973-560-4699.

TABLE 6
SUGGESTED FREQUENCY OF PHYSIOLOGICAL
MONITORING FOR FIT AND ACCLIMATED
WORKERS^A

Adjusted Temperature^b	Normal Work Ensemble^c	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: $ta\ adj\ ^\circ F = ta\ ^\circ F + (13 \times \% \text{ sunshine})$. Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

TABLE 7

HEAT INDEX

RELATIVE HUMIDITY	ENVIRONMENTAL TEMPERATURE (Fahrenheit)										
	70	75	80	85	90	95	100	105	110	115	120
	APPARENT TEMPERATURE*										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	130
30%	67	73	78	84	90	96	104	113	123	135	148
40%	68	74	79	86	93	101	110	123	137	151	
50%	69	75	81	88	96	107	120	135	150		
60%	70	76	82	90	100	114	132	149			
70%	70	77	85	93	106	124	144				
80%	71	78	86	97	113	136					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body
Source: National Oceanic and Atmospheric Administration

How to use Heat Index:

1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	Heat Stress Risk with Physical Activity and/or Prolonged Exposure
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

FIGURES

FIGURE 1

SITE LOCATION MAP



FIGURE 2

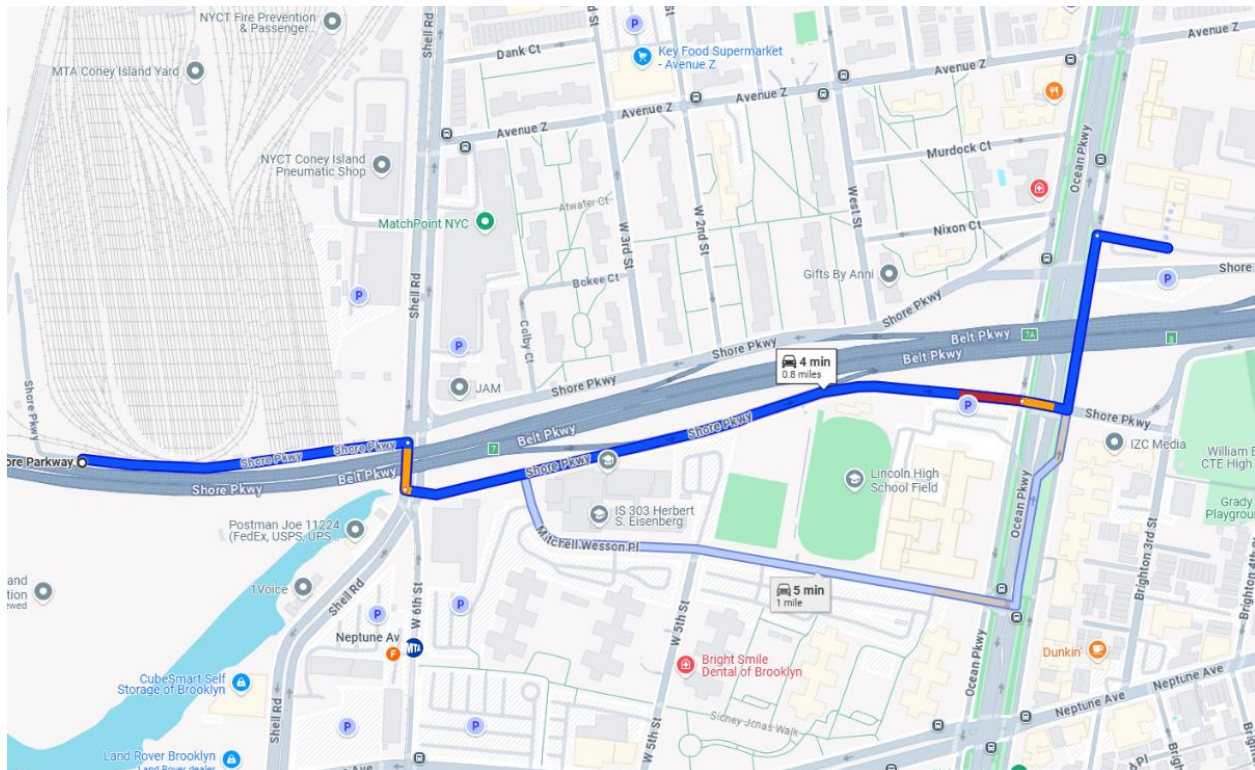
HOSPITAL ROUTE PLAN

Hospital Location: New York City Health and Hospitals/Coney Island
2601 Ocean Parkway
Brooklyn, New York
718-616-3000

START: 2731 West 12th Street, Brooklyn, New York

1. Turn right onto Shore Parkway
2. Turn right onto Shell Road
3. Turn left onto Shore Parkway
4. Turn left onto Ocean Parkway, destination will be on the right

END: New York City Health and Hospitals/Coney Island, 2601 Ocean Parkway, Brooklyn, NY



ATTACHMENTS

ATTACHMENT A

STANDING ORDERS

STANDING ORDERS

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone.
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carry passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to ensure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signal operator to direct backing, as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

ATTACHMENT B

DECONTAMINATION PROCEDURES

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves, and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face piece Removal	6. Face piece is removed (avoid touching face with fingers). Face piece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment, and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoes and pumps may be decontaminated over a portable decontamination pad to contain wash water; or wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic bucket, tub, or other containers. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as many of the instruments as possible with plastic without hindering the operation of the unit. The PID, HNu, or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed of in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

ATTACHMENT C

EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT

EMPLOYEE INCIDENT/INJURY REPORT

LANGAN ENGINEERING & ENVIRONMENTAL SERVICES

(Complete and return to Tony Moffa in the Doylestown Office)

Affected Employee Name: _____

Date: _____

Incident type: ☐ Injury ☐ Report Only/No Injury
☐ Near Miss ☐ Other: _____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: _____ Employee No: _____

Title: _____ Office Location: _____

Length of time employed or date of hire: _____

Mailing address: _____

Sex: M ☐ F ☐ Birth date: _____

Business phone & extension: _____ Residence/cell phone: _____

ACCIDENT INFORMATION

Project: _____ Project #:

Date & time of incident: _____ Time work started & ended: _____

Site location: _____

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident: _____

Exact location incident occurred:

Describe work being done: _____

Describe what affected employee was doing prior to the incident occurring:

Describe in detail how the incident occurred:

Nature of the incident (List the parts of the body affected):

Person(s) to whom the incident was reported (Time and Date):

List the names of other persons affected during this incident:

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

Weather conditions during incident:

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes, when, and where was medical care received:

Provide name of facility (hospital, clinic, etc.):

Length of stay at the facility.

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: _____ Date employee returned to work:

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe:

Did the exposure/injury result in permanent disability? Yes ☐ No ☐ Unknown ☐

If Yes, please describe:

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site-specific Construction Health and Safety Plan?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

Did any limitations in safety equipment or protective clothing contribute to or affect exposure/injury? If so, explain:

Employee Signature

Date

Langan Representative

Date

ATTACHMENT D

CALIBRATION LOG

DATE:_____

PROJECT:_____

CALIBRATION LOG

[illegible]

ATTACHMENT E

MATERIAL SAFETY DATA SHEETS SAFETY DATA SHEETS

All Langan Field Personnel Completing This Work Plan Are To Have Real-Time Accessibility To Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDSs) Through Their Smart Phone.

The link is <http://www.msds.com/>

The login name is "drapehead"

The password is "2angan987"

If You Are Unable To Use the Smart Phone App, You Are To Bring Printed Copies of the MSDS/SDSs to the Site

SAFETY DATA SHEET

Version 5.6
Revision Date 10/12/2015
Print Date 04/18/2017

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : 1-Methylnaphthalene

Product Number : M56808
Brand : Aldrich

CAS-No. : 90-12-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H227
H302
H411

Combustible liquid.
Harmful if swallowed.
Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210
P264
P270
P273
P280
P301 + P312 + P330

Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.
Wear protective gloves/ eye protection/ face protection.
IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you

P370 + P378	feel unwell. Rinse mouth. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Photosensitizer.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₁₁ H ₁₀
Molecular weight	: 142.20 g/mol
CAS-No.	: 90-12-0
EC-No.	: 201-966-8

Hazardous components

Component	Classification	Concentration
1-Methylnaphthalene		
	Flam. Liq. 4; Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H227, H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1-Methylnaphthalene	90-12-0	TWA	0.5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lower Respiratory Tract irritation Lung damage Not classifiable as a human carcinogen Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid
Colour: light yellow |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -22 °C (-8 °F) - lit. |
| f) Initial boiling point and boiling range | 240 - 243 °C (464 - 469 °F) - lit. |
| g) Flash point | 82 °C (180 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 1.001 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | log Pow: 3.87 |
| p) Auto-ignition | No data available |

temperature

- | | |
|------------------------------|-------------------|
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 1,840 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Human

lymphocyte

Sister chromatid exchange

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: QJ9630000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 9 mg/l - 48.0 h

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 1.42 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability Result: - Not readily biodegradable.
Remarks: No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

NA-Number: 1993 Class: NONE Packing group: III
Proper shipping name: Combustible liquid, n.o.s. (1-Methylnaphthalene)
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1-Methylnaphthalene)
Marine pollutant: yes

IATA

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (1-Methylnaphthalene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1-Methylnaphthalene	90-12-0	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1-Methylnaphthalene	90-12-0	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
1-Methylnaphthalene	90-12-0	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H302	Harmful if swallowed.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6

Revision Date: 10/12/2015

Print Date: 04/18/2017

MATERIAL SAFETY DATA SHEET

Date Printed: 05/24/2004

Date Updated: 03/10/2004

Version 1.5

Section 1 - Product and Company Information

Product Name	2-BUTANONE, 99.5+%, HPLC GRADE
Product Number	270695
Brand	ALDRICH
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS MO 63103 US
Technical Phone:	314 771 5765
Emergency Phone:	414 273 3850 Ext. 5996
Fax:	800 325 5052

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
2-BUTANONE	78-93-3	Yes
Formula	C4H8O	
Synonyms	Acetone, methyl- * Aethylmethyleketon (German) * Butanone * 2-Butanone (OSHA) * Butanone 2 (French) * 3-Butanone * Ethyl methyl cetone (French) * Ethylmethyleketon (Dutch) * Ketone, ethyl methyl * Meetco * MEK (OSHA) * Methyl acetone * Methyl ethyl ketone (ACGIH:OSHA) * Metiletilchetone (Italian) * Metyloetyloketon (Polish) * RCRA waste number U159	
RTECS Number:	EL6475000	

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Irritant.
Irritating to respiratory system and skin. Risk of serious damage
to eyes. Vapors may cause drowsiness and dizziness.
Target organ(s): Central nervous system.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 1

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS

Flammable Hazards: Yes

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT

30 °F -1 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1.8 % Upper: 10.1 %

AUTOIGNITION TEMP

516 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Bulk Density	N/A	
Odor Threshold	5.4 - 1 ppm	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	0.4 Pas	25 °C
Surface Tension	24.6 mN/m	20 °C
Partition Coefficient	Log Kow: 0.29	
Decomposition Temp.	N/A	
Flash Point	30 °F -1 °C	Method: closed cup
Explosion Limits	Lower: 1.8 % Upper: 10.1 %	
Flammability	N/A	
Autoignition Temp	516 °C	
Refractive Index	1.379	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:soluble Other Solvents: ALCOHOL, ETHER, ACETONE BENZENE	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions to Avoid: Protect from moisture.

Materials to Avoid: Oxidizing agents, Strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes severe eye irritation.

Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Central nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE

Can cause CNS depression. Exposure can cause: Gastrointestinal disturbances. Narcotic effect.

TOXICITY DATA

Oral

Rat

2737 mg/kg

LD50

Inhalation
Rat
23,500 mg/m³
LC50

Intraperitoneal
Rat
607 MG/KG
LD50

Oral
Mouse
4050 mg/kg
LD50

Inhalation
Mouse
32,000 mg/m³
LC50

Intraperitoneal
Mouse
616 MG/KG
LD50

Skin
Rabbit
6480 mg/kg
LD50

Inhalation
Mammal
38,000 mg/m³
LC50

IRRITATION DATA

Eyes
Human
350 ppm

Skin
Rabbit
500 mg
24H
Remarks: Moderate irritation effect

Skin
Rabbit
402 mg
24H
Remarks: Mild irritation effect

Skin
Rabbit
13.78 mg
24H
Remarks: Open irritation test

Eyes
Rabbit
80 mg

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 3000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Urogenital system. Specific Developmental Abnormalities: Homeostasis

Species: Rat
Dose: 1000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 3000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 7,060 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: 4,600 - 4,880 mg/l

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 3,130 - 3,320 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Ethyl methyl ketone [or] Methyl ethyl ketone
UN#: 1193
Class: 3

Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Methyl ethyl ketone
IATA UN Number: 1193
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: F Xi
Indication of Danger: Highly Flammable. Irritant.
R: 11 36 66 67
Risk Statements: Highly flammable. Irritating to eyes. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.
S: 9 16
Safety Statements: Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU). Irritant.
Risk Statements: Irritating to respiratory system and skin. Risk of serious damage to eyes. Vapors may cause drowsiness and dizziness.
Safety Statements: Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.
US Statements: Target organ(s): Central nervous system.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or

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Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name 2-Methylnaphthalene, 99% (gc)

Cat No. : AC414551000; AC414555000

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number

For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word

Warning

Hazard Statements

Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Storage

Store in a well-ventilated place. Keep container tightly closed
Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
2-Methylnaphthalene	91-57-6	99.0

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes.
Inhalation	Move to fresh air.
Ingestion	Do not induce vomiting.
Most important symptoms/effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media	No information available
---------------------------------------	--------------------------

Flash Point
Method - No information available

Autoignition Temperature No information available
Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

None known

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
2

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions

Ensure adequate ventilation. Use personal protective equipment.

Environmental Precautions

See Section 12 for additional ecological information. Avoid release to the environment.
Collect spillage.

Methods for Containment and Clean Up No information available.

7. Handling and storage

Handling

Ensure adequate ventilation.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
2-Methylnaphthalene	TWA: 0.5 ppm Skin		

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
2-Methylnaphthalene			TWA: 0.5 ppm Skin

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures

Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	No information available
Odor	Odorless
Odor Threshold	No information available
pH	
Melting Point/Range	37 38 °C
Boiling Point/Range	°C
Flash Point	
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	< 1 mmHg @ 25 °C
Vapor Density	No information available
Relative Density	1.0000
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C11H10
Molecular Weight	142.20

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity**Component Information**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
2-Methylnaphthalene	1630 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
2-Methylnaphthalene	91-57-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
2-Methylnaphthalene	Not listed	Pimephales promelas: LC50 = 2.5mg/L	Not listed	EC50 = 1.5 mg/L/48h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
2-Methylnaphthalene	3.86

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
2-Methylnaphthalene	X	X	-	202-078-3	-		X	X	X	X	-

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable**CERCLA**

Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
2-Methylnaphthalene	-	X	-	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials

D2B Toxic materials



16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date

10-Feb-2015

Print Date

10-Feb-2015

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 5.1
Revision Date 06/26/2014
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : 4,4'-DDD

Product Number : 35486

Brand : Sigma-Aldrich

CAS-No. : 72-54-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P322	Specific measures (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,1-Dichloro-2,2-bis(4-chlorophenyl)ethane
TDE

Formula : C₁₄H₁₀Cl₄
Molecular Weight : 320.04 g/mol
CAS-No. : 72-54-8
EC-No. : 200-783-0

Hazardous components

Component	Classification	Concentration
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|---|
| a) Appearance | Form: solid |
| b) Odour | no data available |
| c) Odour Threshold | no data available |
| d) pH | no data available |
| e) Melting point/freezing point | 94.0 - 96.0 °C (201.2 - 204.8 °F) |
| f) Initial boiling point and boiling range | 193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg) |
| g) Flash point | no data available |
| h) Evaporation rate | no data available |
| i) Flammability (solid, gas) | no data available |
| j) Upper/lower flammability or explosive limits | no data available |
| k) Vapour pressure | < 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F) |
| l) Vapour density | no data available |
| m) Relative density | 1.38 g/cm ³ |
| n) Water solubility | no data available |
| o) Partition coefficient: n-octanol/water | log Pow: 6.02 |
| p) Auto-ignition temperature | no data available |
| q) Decomposition temperature | no data available |
| r) Viscosity | no data available |
| s) Explosive properties | no data available |
| t) Oxidizing properties | no data available |

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Hamster - > 5,000 mg/kg

TDLo Oral - Human - 428.5 mg/kg

Remarks: Endocrine:Adrenal cortex hypoplasia.

TDLo Oral - rat - 6,000 mg/kg

Remarks: Cardiac:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Changes in both tubules and glomeruli.

TDLo Oral - rat - 14 mg/kg

Remarks: Liver:Changes in liver weight. Endocrine:Estrogenic. Musculoskeletal:Other changes.

TDLo Oral - rat - 2,100 mg/kg

Remarks: Behavioral:Altered sleep time (including change in righting reflex).

Inhalation: no data available

LD50 Dermal - rabbit - 1,200 mg/kg

Remarks: Behavioral:Excitement. Behavioral:Convulsions or effect on seizure threshold. Skin irritation

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: KI0700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 1.18 - 9 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.04 - 0.05 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.06 - 0.09 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 3.47 - 5.58 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia pulex (Water flea) - 0.01 mg/l - 48 h

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

Indication of bioaccumulation.

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Marine pollutant: No

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

15. REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	72-54-8	2007-09-28
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1

Revision Date: 06/26/2014

Print Date: 05/11/2016

SAFETY DATA SHEET

Version 5.4
Revision Date 01/02/2015
Print Date 12/11/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Acenaphthene

Product Number : 215376
Brand : Aldrich

CAS-No. : 83-32-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 1B), H350

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H315

Causes skin irritation.

H319

Causes serious eye irritation.

H335

May cause respiratory irritation.

H350

May cause cancer.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 1,8-Ethylenenaphthalene
Formula	: C ₁₂ H ₁₀
Molecular weight	: 154.21 g/mol
CAS-No.	: 83-32-9
EC-No.	: 201-469-6

Hazardous components

Component	Classification	Concentration
Acenaphthene		
	Skin Irrit. 2; Eye Irrit. 2A; Carc. 1B; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: solid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 90 - 94 °C (194 - 201 °F) - lit. |
| f) Initial boiling point and boiling range | 279 °C (534 °F) - lit. |
| g) Flash point | 125.0 °C (257.0 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |

k)	Vapour pressure	13.3 hPa (10.0 mmHg) at 131.0 °C (267.8 °F)
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.39 - 4.19
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Rat - 600 mg/kg

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Acenaphthene)
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: Reasonably anticipated to be a human carcinogen (Acenaphthene)
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: AB1000000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.67 mg/l - 96.0 h LC50 - Pimephales promelas (fathead minnow) - 0.6 - 1.73 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.27 - 3.45 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.52 - 0.53 mg/l - 96 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation Lepomis macrochirus (Bluegill) - 28 d
- 0.00894 mg/l

Bioconcentration factor (BCF): 387

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Acenaphthene)
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Acenaphthene)
Marine pollutant: yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Acenaphthene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	83-32-9	2007-09-28
Acenaphthene		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4

Revision Date: 01/02/2015

Print Date: 12/11/2015



SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name Poly(acenaphthylene)
Cat No. : AC178020000; AC178020050; AC178020100
Synonyms None.
Recommended Use Laboratory chemicals.
Uses advised against No Information available
Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Based on available data, the classification criteria are not met

Label Elements

None required

Hazards not otherwise classified (HNOC)

None identified

Unknown Acute Toxicity

.? % of the mixture consists of ingredients of unknown toxicity.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Poly(acenaphthylene)	25036-01-5	100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

	clothes and shoes.
Inhalation	Remove from exposure, lie down. Move to fresh air.
Ingestion	Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. If possible drink milk afterwards.
Most important symptoms/effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO ₂). Dry chemical. alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Thermal decomposition can lead to release of irritating gases and vapors Carbon monoxide (CO) Carbon dioxide (CO₂)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
0

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions	See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling	Avoid contact with skin and eyes. Avoid contact with clothing. Remove and wash contaminated clothing before re-use. Avoid breathing vapors or mists. Do not ingest. Wash thoroughly after handling.
Storage	Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
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Engineering Measures Ensure adequate ventilation, especially in confined areas. Ventilation systems.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Oxidizing agents
Hazardous Decomposition Products	Thermal decomposition can lead to release of irritating gases and vapors, Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Mist LC50 Based on ATE data, the classification criteria are not met. ATE > 5 mg/l.

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Poly(acenaphthylene)	25036-01-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable**CERCLA**

Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

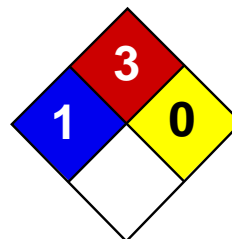
16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Revision Date	10-Feb-2015
Print Date	10-Feb-2015
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Acetone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetone

Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808

CAS#: 67-64-1

RTECS: AL3150000

TSCA: TSCA 8(b) inventory: Acetone

CI#: Not applicable.

Synonym: 2-propanone; Dimethyl Ketone;
Dimethylformaldehyde; Pyroacetic Acid

Chemical Name: Acetone

Chemical Formula: C₃H₆O

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD₅₀): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC₅₀): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to central nervous system (CNS). The substance may be toxic to kidneys, the reproductive system, liver, skin. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:

Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anhydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:

Store in a segregated and approved area (flammables area) . Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States] TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States] TWA: 500 STEL: 1000 [Australia] TWA: 1185 STEL: 2375 (mg/m3) [Australia] TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)] TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)] TWA: 1800 STEL: 2400 from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 56.2°C (133.2°F)

Melting Point: -95.35 (-139.6°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.79 (Water = 1)

Vapor Pressure: 24 kPa (@ 20°C)

Vapor Density: 2 (Air = 1)

Volatility: Not available.

Odor Threshold: 62 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; $\log(\text{oil/water}) = -0.2$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3000 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 44000 mg/m³ 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. Causes damage to the following organs: central nervous system (CNS). May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenicity) based on studies with yeast (*S. cerevisiae*), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies. May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes the placental barrier.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. May be harmful if absorbed through the skin. Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizziness, drowsiness, confusion, headache, muscle weakness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting). Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also

affect the Central Nervous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well as the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects. Chronic Potential Health Effects: Skin: May cause dermatitis. Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fathead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene, Formaldehyde Connecticut hazardous material survey.: Acetone Illinois toxic substances disclosure to employee act: Acetone Illinois chemical safety act: Acetone New York release reporting list: Acetone Rhode Island RTK hazardous substances: Acetone Pennsylvania RTK: Acetone Florida: Acetone Minnesota: Acetone Massachusetts RTK: Acetone Massachusetts spill list: Acetone New Jersey: Acetone New Jersey spill list: Acetone Louisiana spill reporting: Acetone California List of Hazardous Substances (8 CCR 339): Acetone TSCA 8(b) inventory: Acetone TSCA 4(a) final test rules: Acetone TSCA 8(a) IUR: Acetone

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R11- Highly flammable. R36- Irritating to eyes. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information**References:**

-Material safety data sheet issued by: la Commission de la Santé et de la Sécurité du Travail du Québec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. LOLI, RTECS, HSDB databases. Other MSDSs

Other Special Considerations: Not available.

Created: 10/10/2005 08:13 PM

Last Updated: 05/21/2013 12:00 PM

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1. IDENTIFICATION

Catalog Number / Product Name: 32205, 32205-5XX, & 32305 / Aldrin Standard
Company: Restek Corporation
Address: 110 Benner Circle
Bellefonte, Pa. 16823
Phone#: 814-353-1300
Fax#: 814-353-1309
Emergency#: 800-424-9300 (CHEMTREC)
703-527-3887 (Outside the US)
Email: sds@restek.com
Revision Number: 5
Intended use: For Laboratory use only

2. HAZARD(S) IDENTIFICATION**Emergency Overview:****GHS Hazard Symbols:****GHS Classification:**

Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 1
Flammable Liquid Category 2
Acute Toxicity - Inhalation Dust / Mist Category 3
Acute Toxicity - Inhalation Vapour Category 3
Acute Toxicity - Inhalation Gas Category 3
Acute Toxicity - Dermal Category 3
Acute Toxicity - Oral Category 3

GHS Signal Word:

Danger

GHS Hazard:

Highly flammable liquid and vapour.
Toxic if swallowed, in contact with skin or if inhaled.
Toxic if inhaled.
Causes damage to organs.

GHS Precautions:**Safety Precautions:**

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilation and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash hands and skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Measures:

IF SWALLOWED: Immediately call a POISON CENTER/doctor/....
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF exposed: Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment see section 4.

Specific measures see section 4.
Rinse mouth.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
In case of fire: Use extinguishing media in section 5 for extinction.

Storage: Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal: Dispose of contents/container according to section 13 of the SDS.

Single Exposure Target Organs: No data available.

Repeated Exposure Target Organs: No data available.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS #	EINEC #	% Composition
methanol	67-56-1	200-659-6	99.900000
aldrin	309-00-2	206-215-8	0.100000

4. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have a trained individual administer oxygen. Get medical attention immediately.

Eyes: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Ingestion: Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this SDS.

5. FIRE- FIGHTING MEASURES

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water may be ineffective but water spray can be used to extinguish a fire if swept across the base of the flames. Water can absorb heat and keep exposed material from being damaged by fire.

Fire and/or Explosion Hazards: Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a fire (Class B). Vapors are heavier than air and may travel to a source of ignition and flash back.

Fire Fighting Methods and Protection: Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment: Exposure to the spilled material may be severely irritating or toxic. Follow personal protective equipment recommendations found in Section 8 of this SDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred, and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits.

Methods for Clean-up: Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal

protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

7. HANDLING AND STORAGE

Handling Technical Measures and Precautions:	Toxic or severely irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment
Storage Technical Measures and Conditions:	Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
methanol	67-56-1	6000 ppm IDLH	250 ppm STEL	200 ppm TWA	200 ppm TWA; 260 mg/m3 TWA
aldrin	309-00-2	ND		0.05 mg/m3 TWA (inhalable fraction and vapor)	0.25 mg/m3 TWA

Personal Protection:

Engineering Measures:	Local exhaust ventilation is recommended when generating excessive levels of vapors from handling or thermal processing.
Respiratory Protection:	Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms. If an exposure limit is exceeded or if an operator is experiencing symptoms of inhalation overexposure as explained in Section 3, provide respiratory protection.
Eye Protection:	Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.
Skin Protection:	Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color:	No data available.
Odor:	Mild
Physical State:	No data available.
pH:	No data available
Vapor Density:	1.1 (air = 1)
Melting Point:	-98 °C
Flash Point:	52
Flammability:	Highly Flammable
Upper Flammable/Explosive Limit, % in air:	36.0
Lower Flammable/Explosive Limit, % in air:	6.0
Autoignition Temperature:	464 deg C
Decomposition Temperature:	No data available.
Specific Gravity:	0.791 - 0.792 g/cm3 at 20 °C
Evaporation Rate:	No data available.
Odor Threshold:	No data available.
Solubility:	Moderate; 50-99%
Partition Coefficient: n-octanol in water:	No data available.
VOC % by weight:	99.90
Molecular Weight:	32.04

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Conditions to Avoid:	No data available.
Materials to Avoid / Chemical Incompatibility:	Strong oxidizing agents
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry:	Inhalation, Skin Contact, Eye Contact, Ingestion
-------------------------	--

Target Organs Potentially Affected By Exposure: Eyes, Central nervous system stimulation, Skin, GI Tract, Respiratory Tract

Chemical Interactions That Change Toxicity: None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation: Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.

Inhalation Toxicity: Harmful! Can cause systemic damage (see "Target Organs")Methanol can cause central nervous system depression and overexposure can cause damage to the optic nerve resulting in visual impairment or blindness.

Skin Contact: Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.

Eye Contact: Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.

Ingestion Irritation: Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.Highly toxic and may be fatal if swallowed.

Ingestion Toxicity: Toxic if swallowed. May cause target organ failure and/or death.May be fatal if swallowed.

Long-Term (Chronic) Health Effects:

Carcinogenicity: Contains a probable or known human carcinogen.

Reproductive and Developmental Toxicity: Contains a known human reproductive and/or developmental hazard.

Inhalation: Upon prolonged and/or repeated exposure, can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.Harmful! Can cause systemic damage upon prolonged and/or repeated exposure (see "Target Organs)

Skin Contact: Upon prolonged or repeated contact, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.

Ingestion: Toxic if swallowed. May cause target organ failure and/or death.

Component Toxicological Data:

NIOSH:

Chemical Name	CAS No.	LD50/LC50
Methanol	67-56-1	Oral LD50 Rat 5628 mg/kg (Source: NLM_CIP); Inhalation LC50 Rat 83.2 mg/L 4 h (Source: IUCLID)

Component Carcinogenic Data:

OSHA:

Chemical Name	CAS No.
No data available.	

ACGIH:

Chemical Name	CAS No.
No data available.	

NIOSH:

Chemical Name	CAS No.
No data available.	

NTP:

Chemical Name	CAS No.
No data available.	

IARC:

Chemical Name	CAS No.	Group No.
No data.		Group 1
No data.		Group 2A
No data.		Group 2B

12. ECOLOGICAL INFORMATION

Overview: Moderate ecological hazard. This product may be dangerous

Mobility:	to plants and/or wildlife.
Persistence:	No data
Bioaccumulation:	No data
Degradability:	Biodegrades slowly.
Ecological Toxicity Data:	No data available.

13. DISPOSAL CONSIDERATIONS

Waste Description of Spent Product:	Spent or discarded material is a hazardous waste.
Disposal Methods:	Dispose of by incineration following Federal, State, Local, or Provincial regulations.
Waste Disposal of Packaging:	Comply with all Local, State, Federal, and Provincial Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:	
DOT Proper Shipping Name:	Methanol
UN Number:	UN1230
Hazard Class:	3
Packing Group:	II

International:	
IATA Proper Shipping Name:	Methanol
UN Number:	UN1230
Hazard Class:	3 (6.1)
Packing Group:	II

Marine Pollutant:	No
--------------------------	----

15. REGULATORY INFORMATION

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
methanol	67-56-1	X	X	-	X
aldrin	309-00-2	X	X	X	-

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Aldrin	309-00-2	Prop 65 Cancer
Methanol	67-56-1	Prop 65 Develop Tox

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
methanol	67-56-1	X	X	X	X
aldrin	309-00-2	X	X	X	X

16. OTHER INFORMATION

Prior Version Date: 03/23/11

Disclaimer: Restek Corporation provides the descriptions, data and information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. It is provided for your guidance only. Because many factors may affect processing or application/use, Restek Corporation recommends you perform an assessment to determine the suitability of a product for your particular purpose prior to use. No warranties of any kind, either expressed or implied, including fitness for a particular purpose, are made regarding products described, data or information set forth. In no case shall the descriptions, information, or data provided be considered a part of our terms and conditions of sale. Further, the descriptions, data and information furnished hereunder are given gratis. No obligation or liability for the description, data and information given are assumed. All such being given and accepted at your risk.

SAFETY DATA SHEET

Version 5.8
Revision Date 06/02/2016
Print Date 08/02/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α -BHC

Product Number : 48493
Brand : Supelco
Index-No. : 602-042-00-0

CAS-No. : 319-84-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: α -1,2,3,4,5,6-Hexachlorocyclohexane
Formula	: C ₆ H ₆ Cl ₆
Molecular weight	: 290.83 g/mol
CAS-No.	: 319-84-6
EC-No.	: 206-270-8
Index-No.	: 602-042-00-0

Hazardous components

Component	Classification	Concentration
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: solid
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	156.0 - 161.0 °C (312.8 - 321.8 °F)
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 3.80
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 177.0 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)

IARC: 2B - Group 2B: Possibly carcinogenic to humans ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)

NTP: Reasonably anticipated to be a human carcinogen ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: GV3500000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Carassius auratus (goldfish) - 0.12 mg/l - 48.0 h

LC50 - Cyprinus carpio (Carp) - 0.2 mg/l - 48.0 h

LC50 - other fish - 1.49 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 0.20 - 1.70 mg/l - 48 h

Toxicity to algae EC50 - No information available. - > 100.00 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation other fish - 96 h
- 0.8 mg/l

Bioconcentration factor (BCF): 250

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)
Reportable Quantity (RQ): 10 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. ((1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
(1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
(1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
(1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
(1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
(1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2009-02-01

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
(1 α ,2 α ,3 β ,4 α ,5 β ,6 β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0
Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8

Revision Date: 06/02/2016

Print Date: 08/02/2019

SAFETY DATA SHEET

Version 4.9
Revision Date 04/20/2015
Print Date 12/11/2015

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Anthracene

Product Number : A89200
Brand : Aldrich

CAS-No. : 120-12-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H315

Causes skin irritation.

H319

Causes serious eye irritation.

H335

May cause respiratory irritation.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264

Wash skin thoroughly after handling.

P271

Use only outdoors or in a well-ventilated area.

P273

Avoid release to the environment.

P280

Wear eye protection/ face protection.

P280	Wear protective gloves.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Photosensitizer., Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₁₄ H ₁₀
Molecular weight	: 178.23 g/mol
CAS-No.	: 120-12-7
EC-No.	: 204-371-1

Hazardous components

Component	Classification	Concentration
Anthracene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Anthracene	120-12-7	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		

		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C See Appendix A		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Anthracene	120-12-7	1-Hydroxypyrene (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Chloroprene

Minimum layer thickness: 0.6 mm

Break through time: 480 min

Material tested:Camapren® (KCL 722 / Aldrich Z677493, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 30 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: crystalline Colour: beige
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 210 - 215 °C (410 - 419 °F) - lit.
f) Initial boiling point and boiling range	340 °C (644 °F) - lit.
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Lower explosion limit: 0.6 %(V)
k) Vapour pressure	1.3 hPa (1.0 mmHg) at 145.0 °C (293.0 °F)
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 4.45
p) Auto-ignition temperature	540.0 °C (1,004.0 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Hypochlorites

10.6 Hazardous decomposition products

Other decomposition products - No data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - 430 mg/kg

Skin corrosion/irritation

Skin - Mouse

Result: Mild skin irritation

Serious eye damage/eye irritation

Irritating to eyes. The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Respiratory or skin sensitisation

Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Anthracene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: OSHA specifically regulated carcinogen (Anthracene)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation.

The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CA9350000

Possible tumor promoter., Headache, Nausea, Weakness

Blood -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - *Lepomis macrochirus* (Bluegill) - 0.001 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates EC50 - *Daphnia magna* (Water flea) - 0.10 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Indication of bioaccumulation.

Bioaccumulation Pimephales promelas (fathead minnow) - 42 d
- 0.01191 mg/l

Bioconcentration factor (BCF): 649

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Anthracene)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Anthracene)
Marine pollutant: yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Anthracene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-09-28

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9

Revision Date: 04/20/2015

Print Date: 12/11/2015

Antimony

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according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Revision Date: 02/12/2014

Version: 1.0

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

1.1. Product Identifier

Product Form: Substance

Product Name: Antimony

Synonyms: Stibium (Sb)

1.2. Intended Use of the Product No additional information available

1.3. Name, Address, and Telephone of the Responsible Party

Company

Atomized Products Group, Inc

3838 Miller Park Dr

Garland, TX 75042

T 972-272-9596

atomizedproductsgroup.com

1.4. Emergency Telephone Number

Emergency Number : 800-255-3924 (CHEMTEL)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Comb. Dust

Acute Tox. 3 (Oral) H301

Acute Tox. 4 H332

(Inhalation:dust,mist)

Carc. 2 H351

Aquatic Acute 2 H401

Aquatic Chronic 2 H411

2.2. Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US)



Signal Word (GHS-US)

: Danger

Hazard Statements (GHS-US)

: May form combustible dust concentrations in air

H301 - Toxic if swallowed

H332 - Harmful if inhaled

H351 - Suspected of causing cancer

H401 - Toxic to aquatic life

H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements (GHS-US)

: P201 - Obtain special instructions before use.

P202 - Do not handle until all safety precautions have been read and understood.

P261 - Avoid breathing dust.

P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product.

P271 - Use only outdoors or in a well-ventilated area.

P273 - Avoid release to the environment.

P280 - Wear protective gloves, protective clothing, eye protection, face protection, respiratory protection.

P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P308+P313 - If exposed or concerned: Get medical advice/attention.

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P312 - Call a POISON CENTER/doctor/physician if you feel unwell.

P321 - Specific treatment (see section 4).

P330 - If swallowed, rinse mouth.

P391 - Collect spillage.

P405 - Store locked up.

P501 - Dispose of contents/container to local, regional, national, territorial, provincial, and international regulations.

2.3. Other Hazards

Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. May form combustible dust concentrations in air. Exposure may aggravate individuals with pre-existing skin, kidney, liver, and pulmonary disorders. On burning release of harmful/irritant gases/vapours (antimony oxides). Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Name : Antimony

Name	Product identifier	%	Classification (GHS-US)
Antimony	(CAS No) 7440-36-0	100	Comb. Dust Acute Tox. 3 (Oral), H301 Acute Tox. 4 (Inhalation), H332 Carc. 2, H351 Aquatic Acute 2, H401 Aquatic Chronic 2, H411

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid Measures After Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

First-aid Measures After Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists.

First-aid Measures After Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation persists.

First-aid Measures After Ingestion: Rinse mouth. Do not induce vomiting. Seek medical attention if a large amount is swallowed.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: Suspected of causing cancer. Toxic if swallowed. Harmful if inhaled.

Symptoms/Injuries After Inhalation: Harmful if inhaled. Respiratory tract irritation.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: Toxic if swallowed. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: Prolonged exposure may cause effects in specific organs such as the liver, kidneys, blood, and nervous system.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

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5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not considered flammable but may burn at high temperatures. Dust explosion hazard in air.

Explosion Hazard: Avoid dust clouds in combination with static electricity. Dust explosion hazard in air.

Reactivity: Hazardous reactions will not occur under normal conditions. Dust clouds can be explosive.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Other information: Risk of dust explosion. Do not allow the product to be released into the environment. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Handle in accordance with good industrial hygiene and safety practice. Do not breathe dust. Avoid generating dust. Avoid all contact with skin, eyes, or clothing.

6.1.1. For Non-emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Responders

Protective Equipment: Equip cleanup crew with proper protection. Use appropriate personal protection equipment (PPE).

Emergency Procedures: Ventilate area.

6.2. Environmental Precautions

Prevent entry to sewers and public waters. Do not allow to enter drains or water courses.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Avoid generation of dust during clean-up of spills. Use only non-sparking tools.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Avoid generation of dust during clean-up of spills. Use only non-sparking tools. Use explosion proof vacuum during cleanup, with appropriate filter, do not mix with other materials. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Avoid dust production. Accumulation and dispersion of dust with an ignition source can cause a combustible dust explosion, keep dust levels to a minimum and follow applicable regulations. Do not pressurize, cut, or weld containers. . On burning: release of harmful/irritant gases/vapours e.g.: (antimony oxides).

Precautions for Safe Handling: Use only non-sparking tools. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Handle in accordance with good industrial hygiene and safety procedures.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, and lighting equipment. Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from extremely high or low temperatures, ignition sources, incompatible materials.

Incompatible Products: Strong acids. Strong bases. Strong oxidizers.

7.3. Specific End Use(s)

No additional information available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

Antimony (7440-36-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.5 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5 mg/m ³

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USA IDLH	US IDLH (mg/m ³)	50 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.5 mg/m ³

8.2. Exposure Controls

Appropriate Engineering Controls

: Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof equipment. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

: Gloves. Protective goggles. Respiratory protection of the dependent type. Protective clothing.



Materials for Protective Clothing

Hand Protection

: Chemically resistant materials and fabrics.

Eye Protection

: Wear chemically resistant protective gloves.

Skin and Body Protection

: Chemical goggles or safety glasses.

Respiratory Protection

: Wear suitable protective clothing.

: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of dust are expected to exceed exposure limits.

Thermal Hazard Protection

: Wear suitable protective clothing.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Odor	: No data available
Odor Threshold	: No data available
pH	: No data available
Relative Evaporation Rate (butylacetate=1)	: No data available
Melting Point	: No data available
Freezing Point	: No data available
Boiling Point	: No data available
Flash Point	: No data available
Auto-ignition Temperature	: No data available
Decomposition Temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor Density at 20 °C	: No data available
Relative Density	: No data available
Specific Gravity	: No data available
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, Kinematic	: No data available
Viscosity, Dynamic	: No data available
Explosive Properties	: No data available
Oxidizing Properties	: No data available
Explosive Limits	: No data available

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9.2. Other Information No additional information available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: Hazardous reactions will not occur under normal conditions. Dust clouds can be explosive.

10.2 Chemical Stability: Dust clouds can be explosive.

10.3 Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

10.4 Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Open flame. Ignition sources. Incompatible materials.

10.5 Incompatible Materials: Strong acids. Strong bases. Strong oxidizers. Halogenated compounds.

10.6 Hazardous Decomposition Products: Antimony and its oxides. Metal oxides. Inhalation of fumes may cause metal fume fever.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information On Toxicological Effects

Acute Toxicity: Toxic if swallowed. Harmful if inhaled.

Antimony	
ATE (Oral)	500.000 mg/kg body weight
ATE (Dust/Mist)	1.500 mg/l/4h
Antimony (7440-36-0)	
LD50 Oral Rat	100 mg/kg
ATE (Oral)	100.000 mg/kg body weight

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Suspected of causing cancer.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Harmful if inhaled. Respiratory tract irritation.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: Toxic if swallowed. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: Prolonged exposure may cause effects in specific organs such as the liver, kidneys, blood, and nervous system.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General : Toxic to aquatic life with long lasting effects.

12.2. Persistence and Degradability

Antimony	
Persistence and Degradability	May cause long-term adverse effects in the environment.

12.3. Bioaccumulative Potential No additional information available

12.4. Mobility in Soil No additional information available

12.5. Other Adverse Effects

Other Information : Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Additional Information: The materials contained within this product are hazardous to the environment, do not release into the environment.

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SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : ANTIMONY POWDER
Hazard Class : 6.1
Identification Number : UN2871
Label Codes : 6.1
Packing Group : III
Marine Pollutant : Marine pollutant
ERG Number : 170



14.2 In Accordance with IMDG

Proper Shipping Name : ANTIMONY POWDER
Hazard Class : 6.1
Identification Number : UN2871
Packing Group : III
Label Codes : 6.1
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-A
MFAG Number : 171



14.3 In Accordance with IATA

Proper Shipping Name : ANTIMONY POWDER
Packing Group : III
Identification Number : UN2871
Hazard Class : 6
Label Codes : 6.1
ERG Code (IATA) : 6L



SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Antimony	
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Immediate (acute) health hazard
Antimony (7440-36-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 313 - Emission Reporting	1.0 %

15.2 US State Regulations

Antimony (7440-36-0)
U.S. - California - Priority Toxic Pollutants - Human Health Criteria
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Connecticut - Water Quality Standards - Consumption of Organisms Only
U.S. - Connecticut - Water Quality Standards - Consumption of Water and Organisms
U.S. - Connecticut - Water Quality Standards - Health Designations
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Florida - Drinking Water Standards - Inorganic Contaminants - Maximum Contaminant Levels (MCLs)
U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - TWAs

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U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Maryland - Surface Water Quality Standards - Consumption of Organisms Only
U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TEELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - North Dakota - Water Quality Standards - Human Health Value for Class III
U.S. - North Dakota - Water Quality Standards - Human Health Value for Classes I, IA, II
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 24-Hour
U.S. - Rhode Island - Water Quality Standards - Acute Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Chronic Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Aquatic Organisms Only
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Water and Aquatic Organisms
U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Vermont - Hazardous Waste - Hazardous Constituents
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Virginia - Water Quality Standards - Public Water Supply Effluent Limits
U.S. - Virginia - Water Quality Standards - Surface Waters Not Used for the Public Water Supply Effluent Limits

Antimony

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

SECTION 16: OTHER INFORMATION

Revision date : 02/12/2014
Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Aquatic Acute 2	Hazardous to the aquatic environment - Acute Hazard Category 2
Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Carc. 2	Carcinogenicity Category 2
Comb. Dust	Combustible Dust
	May form combustible dust concentrations in air
H301	Toxic if swallowed
H332	Harmful if inhaled
H351	Suspected of causing cancer
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom) - US

Safety Data Sheet acc. to OSHA HCS

Printing date 01/17/2019

Reviewed on 01/17/2019

1 Identification

- **Product identifier**
- **Product Name:** Aroclor 1242
- **Part Number:** PCB-1242
- **Application of the substance / the mixture** Certified Reference Material
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
SPEX CertiPrep, LLC.
203 Norcross Ave, Metuchen,
NJ 08840 USA
- **Information department:** product safety department
- **Emergency telephone number:**
Emergency Phone Number (24 hours)
CHEMTREC (800-424-9300)
Outside US: 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS08 Health hazard

Repr. 2 H361 Suspected of damaging fertility or the unborn child.

STOT RE 2 H373 May cause damage to organs through prolonged or repeated exposure.

Asp. Tox. 1 H304 May be fatal if swallowed and enters airways.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

STOT SE 3 H336 May cause drowsiness or dizziness.

- **Label elements**

- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**



GHS02



GHS07



GHS08

- **Signal word** Danger

- **Hazard-determining components of labeling:**

n-hexane

- **Hazard statements**

H225 Highly flammable liquid and vapor.

H315 Causes skin irritation.

H361 Suspected of damaging fertility or the unborn child.

H336 May cause drowsiness or dizziness.

H373 May cause damage to organs through prolonged or repeated exposure.

H304 May be fatal if swallowed and enters airways.

- **Precautionary statements**

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

If swallowed: Immediately call a poison center/doctor.

Specific treatment (see on this label).

Do NOT induce vomiting.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

(Contd. on page 2)

Safety Data Sheet acc. to OSHA HCS

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Product Name: Aroclor 1242

(Contd. of page 1)

Take off contaminated clothing and wash it before reuse.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Classification system:**· **NFPA ratings (scale 0 - 4)**· **HMIS-ratings (scale 0 - 4)**

HEALTH	1	Health = 1
FIRE	3	Fire = 3
REACTIVITY	0	Reactivity = 0

· **Other hazards**· **Results of PBT and vPvB assessment**· **PBT:** Not applicable.· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization:** Mixtures· **Description:** Mixture of the substances listed below with nonhazardous additions.· **Dangerous components:**

110-54-3	n-hexane	99.98%
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· **Chemical identification of the substance/preparation**

53469-21-9	Aroclor 1242	0.02%
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4 First-aid measures

· **Description of first aid measures**· **General information:**

Immediately remove any clothing soiled by the product.

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.· **After skin contact:** Immediately rinse with water.· **After eye contact:** Rinse opened eye for several minutes under running water.· **After swallowing:** Do not give anything to eat or drink - Do not induce vomiting· **Information for Doctor:**· **Most important symptoms and effects, both acute and delayed** No further relevant information available.· **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**· **Suitable extinguishing agents:** CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.· **For safety reasons unsuitable extinguishing agents:** Water with full jet· **Special hazards arising from the substance or mixture** During heating or in case of fire poisonous gases are produced.· **Advice for firefighters**· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**

Mount respiratory protective device.

Wear protective equipment. Keep unprotected persons away.

· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.· **Methods and material for containment and cleaning up:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

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- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

- **Protective Action Criteria for Chemicals**

- **PAC-1:**

110-54-3	n-hexane	260 ppm
53469-21-9	Aroclor 1242	3 mg/m ³

- **PAC-2:**

110-54-3	n-hexane	2900* ppm
53469-21-9	Aroclor 1242	140 mg/m ³

- **PAC-3:**

110-54-3	n-hexane	8600** ppm
53469-21-9	Aroclor 1242	840 mg/m ³

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** Store in a cool location.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**
Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**

- **Components with limit values that require monitoring at the workplace:**

110-54-3 n-hexane		
PEL	Long-term value: 1800 mg/m ³ , 500 ppm	
REL	Long-term value: 180 mg/m ³ , 50 ppm	
TLV	Long-term value: 176 mg/m ³ , 50 ppm	
	Skin; BEI	

- **Ingredients with biological limit values:**

110-54-3 n-hexane		
BEI	0.4 mg/L	
	Medium: urine	
	Time: end of shift at end of workweek	
	Parameter: 2,5-Hexanedione without hydrolysis	

- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
- **Respiratory protection:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

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Safety Data Sheet
acc. to OSHA HCS

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Product Name: Aroclor 1242

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Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection:

Tightly sealed goggles

9 Physical and chemical properties

Information on basic physical and chemical properties**General Information****Appearance:**

Form:	Liquid
Color:	Colorless
Odor:	Characteristic
Odour Threshold:	Not applicable.

pH-value: Not applicable.

Change in condition

Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	69 °C (156.2 °F)

Flash point: < 0 °C (<32 °F)

Flammability (solid, gaseous): Not applicable.

Ignition temperature: 240 °C (464 °F)

Decomposition temperature: Not applicable.

Auto igniting: Product is not selfigniting.

Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

Explosion limits:

Lower:	1.2 Vol %
Upper:	7.4 Vol %

Vapor pressure at 20 °C (68 °F): 160 hPa (120 mm Hg)

Density at 20 °C (68 °F) 0.66 g/cm³ (5.5077 lbs/gal)

Relative density Not applicable.

Vapor density Not applicable.

Evaporation rate Not applicable.

Solubility in / Miscibility with

Water: Not miscible or difficult to mix.

Partition coefficient (n-octanol/water): Not applicable.

Viscosity:

Dynamic:	Not applicable.
Kinematic:	Not applicable.

Solvent content:

Organic solvents:	100.0 %
VOC content:	99.98 %

Solids content: 0.0 %

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Printing date 01/17/2019

Reviewed on 01/17/2019

Product Name: Aroclor 1242

(Contd. of page 4)

· **Other information** No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant
Product is suspected to cause damage to fertility.
Product is suspected to cause birth defects.

- **Carcinogenic categories**

- **IARC (International Agency for Research on Cancer)**

53469-21-9 Aroclor 1242

2A

- **NTP (National Toxicology Program)**

None of the ingredients is listed.

- **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 2 (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:** Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

US

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS





Printing date 01/17/2019

Reviewed on 01/17/2019

Product Name: Aroclor 1242

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14 Transport information

<ul style="list-style-type: none"> · UN-Number · DOT, ADR, IMDG, IATA 	UN1208
<ul style="list-style-type: none"> · UN proper shipping name · DOT · ADR · IMDG · IATA 	Hexanes 1208 Hexanes, ENVIRONMENTALLY HAZARDOUS HEXANES, MARINE POLLUTANT HEXANES
<ul style="list-style-type: none"> · Transport hazard class(es) · DOT 	
<ul style="list-style-type: none"> · Class · Label 	3 Flammable liquids 3
<ul style="list-style-type: none"> · ADR, IMDG 	 
<ul style="list-style-type: none"> · Class · Label 	3 Flammable liquids 3
<ul style="list-style-type: none"> · IATA 	
<ul style="list-style-type: none"> · Class · Label 	3 Flammable liquids 3
<ul style="list-style-type: none"> · Packing group · DOT, ADR, IMDG, IATA 	II
<ul style="list-style-type: none"> · Environmental hazards: · Marine pollutant: · Special marking (ADR): 	Product contains environmentally hazardous substances: n-hexane Symbol (fish and tree) Symbol (fish and tree)
<ul style="list-style-type: none"> · Special precautions for user · Danger code (Kemler): · EMS Number: · Stowage Category 	Warning: Flammable liquids 33 F-E,S-D E
<ul style="list-style-type: none"> · Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code 	Not applicable.
<ul style="list-style-type: none"> · Transport/Additional information: 	
<ul style="list-style-type: none"> · ADR · Excepted quantities (EQ) 	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
<ul style="list-style-type: none"> · IMDG · Limited quantities (LQ) · Excepted quantities (EQ) 	1L Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
<ul style="list-style-type: none"> · UN "Model Regulation": 	UN 1208 HEXANES, 3, II, ENVIRONMENTALLY HAZARDOUS

US

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Product Name: Aroclor 1242

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15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· Section 313 (Specific toxic chemical listings):

110-54-3 n-hexane

· TSCA (Toxic Substances Control Act):

110-54-3 n-hexane

· Proposition 65

· Chemicals known to cause cancer:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for males:

110-54-3 n-hexane

· Chemicals known to cause developmental toxicity:

None of the ingredients is listed.

· Carcinogenic categories

· EPA (Environmental Protection Agency)

110-54-3 n-hexane

II

53469-21-9 Aroclor 1242

B2

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients is listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

53469-21-9 Aroclor 1242

· GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms



GHS02



GHS07



GHS08

· Signal word Danger

· Hazard-determining components of labeling:

n-hexane

· Hazard statements

H225 Highly flammable liquid and vapor.

H315 Causes skin irritation.

H361 Suspected of damaging fertility or the unborn child.

H336 May cause drowsiness or dizziness.

H373 May cause damage to organs through prolonged or repeated exposure.

H304 May be fatal if swallowed and enters airways.

· Precautionary statements

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

If swallowed: Immediately call a poison center/doctor.

Specific treatment (see on this label).

Do NOT induce vomiting.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

Take off contaminated clothing and wash it before reuse.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Department issuing SDS: product safety department

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US

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/17/2019

Reviewed on 01/17/2019

Product Name: Aroclor 1242

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· Contact:

SPEX CertiPrep, LLC.
1-732-549-7144

· Date of preparation / last revision 01/17/2019 / -**· Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

BEI: Biological Exposure Limit

Flam. Liq. 2: Flammable liquids – Category 2

Skin Irrit. 2: Skin corrosion/irritation – Category 2

Repr. 2: Reproductive toxicity – Category 2

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2

Asp. Tox. 1: Aspiration hazard – Category 1

US

SAFETY DATA SHEET

Version 5.3
Revision Date 09/11/2015
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Aroclor 1248

Product Number : 48589
Brand : Supelco
Index-No. : 602-039-00-4

CAS-No. : 12672-29-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Specific target organ toxicity - repeated exposure (Category 2), H373

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H373

May cause damage to organs through prolonged or repeated exposure.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P260

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P273

Avoid release to the environment.

P314

Get medical advice/ attention if you feel unwell.

P391

Collect spillage.

P501

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

CAS-No. : 12672-29-6
Index-No. : 602-039-00-4

Hazardous components

Component	Classification	Concentration
Aroclor 1248		
	STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Aroclor 1248	12672-29-6	TWA	0.001000 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Potential Occupational Carcinogen		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 11,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

Reproductive toxicity - Monkey - Oral

Maternal Effects: Menstrual cycle changes or disorders.

Reproductive toxicity - Monkey - Oral

Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Reproductive toxicity - Monkey - Oral

Effects on Fertility: Abortion.

Reproductive toxicity - Monkey - Oral

Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Behavioral. Effects on Newborn: Other postnatal measures or effects.

No data available

Developmental Toxicity - Rabbit - Oral

Specific Developmental Abnormalities: Immune and reticuloendothelial system.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Nausea, Dizziness, Headache, muscle pain, muscle weakness, neck stiffness, trunk stiffness, stiffness of extremities, thick feeling in the tongue, Thirst

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - *Lepomis macrochirus* - 0.278 mg/l - 96.0 h

Toxicity to algae Growth inhibition EC50 - *Thalassiosira rotula* - 0.02 mg/l - 44 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation *Pimephales promelas* (fathead minnow) - 250 d
- 3 µg/l

Bioconcentration factor (BCF): 120,000

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2315 Class: 9 Packing group: II

Proper shipping name: Polychlorinated biphenyls, liquid

Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2315 Class: 9 Packing group: II EMS-No: F-A, S-A

Proper shipping name: POLYCHLORINATED BIPHENYLS, LIQUID

Marine pollutant: yes

IATA

UN number: 2315 Class: 9 Packing group: II

Proper shipping name: Polychlorinated biphenyls, liquid

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Aroclor 1248	12672-29-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Aroclor 1248	12672-29-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Aroclor 1248	12672-29-6	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

Aroclor 1248

CAS-No.	Revision Date
12672-29-6	2008-08-01

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Aroclor 1248

CAS-No.	Revision Date
12672-29-6	2008-08-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
STOT RE	Specific target organ toxicity - repeated exposure

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3

Revision Date: 09/11/2015

Print Date: 05/11/2016

SAFETY DATA SHEET

Version 5.2
Revision Date 02/27/2015
Print Date 05/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Aroclor 1254

Product Number : 48586
Brand : Supelco
Index-No. : 602-039-00-4

CAS-No. : 11097-69-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.

P314 Get medical advice/ attention if you feel unwell.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

CAS-No. : 11097-69-1
Index-No. : 602-039-00-4

Hazardous components

Component	Classification	Concentration
Aroclor 1254		
	Acute Tox. 4; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Aroclor 1254	11097-69-1	TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation		
		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Liver damage Chloracne Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Liver damage Chloracne Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	0.001000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|-------------------|
| a) Appearance | Form: liquid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | No data available |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | No data available |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | No data available |
| p) Auto-ignition temperature | No data available |
| q) Decomposition | No data available |

temperature

- r) Viscosity No data available
- s) Explosive properties No data available
- t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 1,010 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Rat

Liver

Unscheduled DNA synthesis

Rat

Liver

DNA damage

Mouse

fibroblast

Morphological transformation.

Rat

Morphological transformation.

Rat
DNA damage

Rat
DNA damage

Carcinogenicity

Carcinogenicity - Rat - Oral
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal: Tumors.

Carcinogenicity - Rat - Oral
Tumorigenic: Carcinogenic by RTECS criteria. Liver: Tumors.

Carcinogenicity - Mouse - Skin
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.
Tumorigenic: Tumors at site of application.

Carcinogenicity - Rat - Oral
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal: Tumors.

Carcinogenicity - Mouse - Oral
Tumorigenic: Neoplastic by RTECS criteria. Liver: Tumors.

Carcinogenicity - Mouse - Intraperitoneal
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic Effects: Uterine tumors. Lungs, Thorax, or Respiration: Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

Reproductive toxicity - Rabbit - Oral
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Effects on Fertility: Abortion. Effects on Embryo or Fetus: Fetal death.

Reproductive toxicity - Rabbit - Oral
Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Behavioral.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Delayed effects.

Reproductive toxicity - Rat - Intraperitoneal
Maternal Effects: Other effects. Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Mouse - Oral
Effects on Newborn: Behavioral.

Reproductive toxicity - Mammal - Oral
Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

No data available

Developmental Toxicity - Rat - Oral

Specific Developmental Abnormalities: Hepatobiliary system.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - *Oncorhynchus mykiss* (rainbow trout) - 0.22 µg/l - 96.0 h

Toxicity to algae LC50 - Algae - 0.015 mg/l - 28 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation *Pimephales promelas* (fathead minnow) - 8 Months
- 1.8 µg/l

Bioconcentration factor (BCF): 238,000

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2315 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, liquid
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2315 Class: 9 Packing group: II EMS-No: F-A, S-A

Proper shipping name: POLYCHLORINATED BIPHENYLS, LIQUID
Marine pollutant: yes
IATA
UN number: 2315 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, liquid

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.
Aroclor 1254

CAS-No.	Revision Date
11097-69-1	1990-06-30

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
Aroclor 1254

CAS-No.	Revision Date
11097-69-1	1990-06-30

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
STOT RE	Specific target organ toxicity - repeated exposure

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.2

Revision Date: 02/27/2015

Print Date: 05/01/2016

SAFETY DATA SHEET

Version 5.3
Revision Date 06/25/2015
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : AROCLOR 1260

Product Number : CRM48736

Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 1B), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H350 : May cause cancer.

Precautionary statement(s)

P201 : Obtain special instructions before use.

P202 : Do not handle until all safety precautions have been read and understood.

P280 : Wear protective gloves/ protective clothing/ eye protection/ face protection.

P308 + P313 : IF exposed or concerned: Get medical advice/ attention.

P405 : Store locked up.

P501 : Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Hazardous components

Component		Classification	Concentration
Distillates (petroleum), hydrotreated middle			
CAS-No.	64742-46-7	Carc. 1B; H350	>= 90 - <= 100 %
EC-No.	265-148-2		
Index-No.	649-221-00-X		
Baseoil - unspecified			
CAS-No.	64742-53-6	Carc. 1B; H350	>= 30 - < 50 %
EC-No.	265-156-6		
Index-No.	649-466-00-2		
2,6-di-tert-Butyl-p-cresol			
CAS-No.	128-37-0	Aquatic Acute 1; Aquatic Chronic 1; H410	>= 0.1 - < 1 %
EC-No.	204-881-4		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Distillates (petroleum), hydrotreated middle	64742-46-7	TWA	500.000000 ppm 2,000.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	The value in mg/m3 is approximate.		

		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	5 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10 mg/m3	USA. NIOSH Recommended Exposure Limits
Baseoil - unspecified	64742-53-6	TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2,6-di-tert-Butyl-p-cresol)

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Distillates (petroleum), hydrotreated middle)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Nerves. - (Aroclor 1260)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

Distillates (petroleum), hydrotreated middle
Baseoil - unspecified

CAS-No.	Revision Date
64742-46-7	1989-08-11
64742-53-6	1993-04-24

Pennsylvania Right To Know Components

Distillates (petroleum), hydrotreated middle
Baseoil - unspecified

CAS-No.	Revision Date
64742-46-7	1989-08-11
64742-53-6	1993-04-24

New Jersey Right To Know Components

Distillates (petroleum), hydrotreated middle
Baseoil - unspecified

CAS-No.	Revision Date
64742-46-7	1989-08-11
64742-53-6	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

Aroclor 1260

Distillates (petroleum), hydrotreated middle

CAS-No.	Revision Date
11096-82-5	2008-08-01

64742-46-7	2013-12-20
------------	------------

WARNING: This product contains a chemical known to the

CAS-No.	Revision Date
---------	---------------

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3

Revision Date: 06/25/2015

Print Date: 05/11/2016



**Material Safety
Data Sheets**

Division of Facilities Services

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

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Section 1 - Product and Company Identification
ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Product Identification: ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Date of MSDS: 08/01/1997 **Technical Review Date:** 09/01/1999

FSC: 6810 **NIIN:** LIIN: 00N092040

Submitter: N NF

Status Code: A

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: UNITED MINERAL & CHEMICAL CORP
Manufacturer's Address1: 1100 VALLEYBROOK AVE
Manufacturer's Address2: LYNDHURST, NJ 07071
Manufacturer's Country: US
General Information Telephone: 201-507-3300
Emergency Telephone: (800)424-9300
Emergency Telephone: (800)424-9300
Chemtec Telephone: (800)424-9300
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 87730

Contractor Information

Contractor's Name: UNITED MINERAL & CHEMICAL CORP
Contractor's Address1: 1100 VALLEYBROOK AVE
Contractor's Address2: LYNDHURST, NJ 07071
Contractor's Telephone: 201-507-3300
Contractor's CAGE: 87730

Section 2 - Compositon/Information on Ingredients

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Ingredient Name: ARSENIC; (ARSENIC METAL)
Ingredient CAS Number: 7440-38-2 **Ingredient CAS Code:** T
RTECS Number: CG0525000 **RTECS Code:** T
=WT: 100. **=WT Code:** M
=Volume: **=Volume Code:**
>WT: **>WT Code:**
>Volume: **>Volume Code:**
<WT: **<WT Code:**
<Volume: **<Volume Code:**
% Low WT: **% Low WT Code:**
% High WT: **% High WT Code:**
% Low Volume: **% Low Volume Code:**
% High Volume: **% High Volume Code:**
% Text:
% Enviromental Weight:
Other REC Limits: N/P
OSHA PEL: N/P **OSHA PEL Code:**
OSHA STEL: N/P **OSHA STEL Code:**
ACGIH TLV: 0.01 MG/M3 **ACGIH TLV Code:** T
ACGIH STEL: NOT ESTABLISHED **ACGIH STEL Code:** T
EPA Reporting Quantity: 1 LB
DOT Reporting Quantity: 1 LB
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Health Hazards Acute & Chronic: ARSENIC METAL IS NOT AS READILY AVAIL IN THE BODY AS ARSENIC IN THE FORM OF DUST OR VAP OR WHEN PROCESSED INTO ARSENIC CMPDS (ARSENICALS). INORGANIC ARSENICALS ARE MORE TOXIC THAN ORGANIC ARSENICALS. ACUTE EFTS: ARSENIC IS POISON BY SUBCUTANEOUS, INTRAMUSCULAR & INTRAPERITONEAL ROUTES. ACUTE ARSENIC POISONING FROM INGEST RSLTS IN MARKED IRRIT OF STOMACH & INTESTINES W/NAUS, VOMIT & DIARR. IN SEV C ASES STOOLS & VOMIT ARE BLOODY & PATIENT MAY GO INTO COLLAPSE & SHOCK W/WEAK, RAPID PULSE, COLD SWEATS, COMA & DEATH. INHAL MAY CAUSE ULCERATION OF NASAL SEPTUM, RESP IRRIT. SKIN/EYE CNTCT MAY CAUSE DERM, SKIN & EYE (EFTS OF OVEREXP)

Signs & Symptoms of Overexposure:

HLTH HAZS: IRRIT. CHRONIC EFTS: ARSENIC IS CONFIRMED HUMAN CARCIN PRODUCING LIVER TUMORS & AN EXPERIMENTAL TERATOGEN (MAY CAUSE DMG TO DEVELOPING FETUS). CHRONIC ARSENIC POISONING MAY INCL ANY/ALL OF FOLLOWING: DIGEST SYS DISTURBS, LOSS OF APPETITE, CRAMPS, NAUS, CONSTIP, DIARR; LIVER DMG WHICH MAY RSLT IN JAUN; DISTURBS OF BLOOD, KIDNEYS & NERVOUS SYS; SKIN ABNORMS INCL ITCHING, PIGMENTATION & POS S CANCEROUS CHGS. TARGET ORGANS FOR INORGANIC CMPDS AS AS): LIVER, KIDNEYS, SKIN, LUNGS, LYMPHATIC SYS. TLV: 0.01 MG/M3 TWA ARSENIC, ELEMENTAL & INORGANIC CMPDS (EXCEPT ARSINE), AS AS. OSHA PEL: (SUPD AT)

Medical Conditions Aggravated by Exposure:

KNOWN EFFECTS ON OTHER ILLNESSES: GASTROINTESTINAL. NERVOUS SYSTEM. SKIN. LIVER & KIDNEY PROBLEMS. AFTER EXPOSURE HAVE URINE TEST.

LD50 LC50 Mixture: LD50: (ORAL, RAT) 763 MG/M3

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Indicators

NTP: YES

IARC: YES

OSHA: YES

Carcinogenicity Explanation: ARSENIC: IARC MONOGRAPHS, SUPPLEMENT, VOL 7, PG 100, 1987: GROUP 1. NTP 8TH ANNUAL REPORT ON CARCINOGENS, 1998: KNOWN TO BE CARCINOGEN. OSHA REGULATED: CFR 29 1910.1018.

Section 4 - First Aid Measures

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

First Aid:

SKIN: FLUSH WITH SOAP AND WATER. AVOID RUBBING INTO SKIN. CONTACT MD IMMEDIATELY. EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONTACT PHYSICIAN IMMEDIATELY. INHALATION: REMOVE TO FRESH AIR. PROVIDE OXYGEN IF NECESSARY. CONTACT PHYSICIAN IMMEDIATELY. INGESTION: TREATMENT WITH BAS(DIMERCAPTOL) IS OF QUESTIONABLE EFFECTIVENESS IN TRIVALENT ARSENIC COMPOUNDS. INDUCE VOMITING AND DO GASTRIC LAVAGE. GET PERSONNEL TO HOSPITAL IMMEDIATELY. A PHYSICIAN CAN INITIATE AN EXCHANGE TRANSFUSION AND DIALYSIS. ALSO ABSORPTION AND REMOVAL WITH ANIMAL BONE COAL OR $\text{Fe}(\text{OH})_2$ SHOULD BE DONE.

Section 5 - Fire Fighting Measures

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Fire Fighting Procedures:

USE NIOSH APPRVD SCBA & FULL PROT EQUIP (FP N). RESTRICT PERS NOT WEARING PROT EQUIP FROM AREA. TRY TO SNUFF FIRE W/SAND, DRY MEDIA, FOAM OR CO*2. IF NO OTHER OPTIONS AVAILABLE, USE WATER & ALWAYS WEA R NIOSH APPRVD SCBA OR NIOSH TOXIC VAPOR RESP. POISONOUS GASES ARE PRODUCED IN FIRE, INCLUDING ARSENIC OXIDES.

Unusual Fire or Explosion Hazard:

ARSENIC, WHEN HEATED OR IN CONTACT W/ACID OR ACID FUMES, CAN PRODUCE HIGHLY TOXIC FUMES. ARSENIC REACTS VIGOROUSLY W/OXIDIZING MATLS. ARSENIC IS FLAMMABLE IN FORM OF DUST WHEN EXPOSED TO HEAT OR FLAME OR BY CHEMICAL RXN W/POWERFUL OXIDIZERS. SLIGHT EXPLOSION HAZ EXISTS IN FORM OF DUST WHEN EXPOSED TO (ECOLOGICAL INFO)

Extinguishing Media:

FOAM, CARBON DIOXIDE, DRY CHEMICAL.

Flash Point: Flash Point Text: NONE

Autoignition Temperature:

Autoignition Temperature Text: N/K

Lower Limit(s): N/A

Upper Limit(s): N/A

Section 6 - Accidental Release Measures

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Spill Release Procedures:

RESTRICT PERSONS NOT WEARING PROTECTIVE EQUIPMENT FROM AREA UNTIL CLEANUP IS COMPLETE. WEARING NIOSH APPROVED RESPIRATOR, GLOVES, GOGGLES, LAB COAT, GATHER UP CHUNKS, RODS OR GRANULES WITH VACUUM OR U TENSILS RESERVED FOR POISONOUS SOLIDS. AVOID RAISING DUST. VENTILATE THE AREA AFTER CLEANUP IS COMPLETE.

Section 7 - Handling and Storage

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Respiratory Protection:

NIOSH APPROVED, AIR PURIFYING, TOXIC VAPOR RESPIRATOR TO PARTICULATE AND FUME AIR LEVEL. FOR INORGANIC ARSENIC APPLICATIONS, SEE 29 CFR 1910.1018 FOR PROPER RESPIRATOR SELECTION.

Ventilation:

LOC EXHST/MECH (GEN) SCRUBBER OR TRAP IF POSS TO MAINTAIN EXPOS TO LESS THAN PERMISSIBLE LIMITS FOR ELEMENTAL ARSENIC & ANY CMPDS BEING GENERATED.

Protective Gloves:

NEOPRENE OR PLASTIC.

Eye Protection: ANSI APPROVED CHEMICAL WORKERS GOGGLES (FP N).**Other Protective Equipment:** ANSI APPROVED EYE WASH AND DELUGE SHOWER (FP N). LAB COAT.**Work Hygenic Practices:** N/P**Supplemental Health & Safety Information:** EFTS OF OVEREXP: 0.01 MG/M3 AS AS & INORGANIC CMPDS; 0.5 AS AS ORGANIC CMPDS. ACGIH TLV: 0.01 MG/M3 TWA ARSENIC, ELEMENTAL & INORGANIC CMPDS (EXCEPT ARSINE), AS AS. ALSO SEE TOXICOLOGICAL INFO. WASTE DISP METH: HAZ DEPENDING ON LEVEL OF TOX CHARACT OF ARSENIC. SEE 40 CFR 261.24 FOR DETERMINATION. (OTHER INFO)

Section 9 - Physical & Chemical Properties
ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

HCC:**NRC/State License Number:****Net Property Weight for Ammo:****Boiling Point:** =612.C, 1133.6F **Boiling Point Text:** SUBLIMES**Melting/Freezing Point:** =814.C, #####F **Melting/Freezing Text:** @ 36 ATM. FP:N/A**Decomposition Point:** **Decomposition Text:** N/P**Vapor Pressure:** 1 MMHG @ 372C **Vapor Density:** N/A**Percent Volatile Organic Content:****Specific Gravity:** 5.727**Volatile Organic Content Pounds per Gallon:****pH:** NONE-0% IN H*2O**Volatile Organic Content Grams per Liter:****Viscosity:** N/P**Evaporation Weight and Reference:** N/A**Solubility in Water:** INSOLUBLE**Appearance and Odor:** SILVER GRAY CRYSTALLINE CHUNKS, RODS OR GRANULES; NO ODOR AS (ECOLOGICAL INFO)**Percent Volatiles by Volume:** N/A (BY WT)**Corrosion Rate:** N/P

Section 10 - Stability & Reactivity Data
ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Stability Indicator: YES**Materials to Avoid:**

INCOMPATIBLE W/BROMINE AZIDE, DIRUBIDIUM ACETYLIDE, HALOGENS, PALLADIUM ZINC, PLATINUM, NCL*3, AGNO*3, CRO*3, NA*2O*2, HEXAFLUOROISOPROPYLIDENEAMINO LITHIUM. CAN REACT W/ACIDS OR ACID FUMES & POWERFUL OXIDIZERS SUCH AS BROM

Stability Condition to Avoid:

AVOID OPEN CONTAINERS AND CONTACT WITH INCOMPATIBLE MATERIALS.

Hazardous Decomposition Products:

ARSENIC FUMES, ARSINE, OTHER ARSENIC COMPOUNDS.

Hazardous Polymerization Indicator: NO**Conditions to Avoid Polymerization:**

N/P

Section 11 - Toxicological Information

ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE

Toxicological Information:

LD50: TDLO 605 ?G/KG. ORAL-MAN TDLO 7857 MG/KG/55Y SKIN. DERMAL IRRITATION-RABBIT: UNKNOWN; SUBCUTANEOUS IMPLANT RABBIT LTLO 75 MG/KG. EYE IRRITATION-RABBIT: UNKNOWN.

Section 12 - Ecological Information**ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE**

Ecological Information:

N/P. EXPLO HAZ: FLAME. IN EVENT OF A FIRE OR SPILL CONTACT THE STATE DEPARTMENT OF THE ENVIRONMENT & YOUR REGIONAL OFFICE OF THE FEDERAL EPA. PHYSICAL DATA - APPEAR/ODOR: METAL AS COMPOUND, ASH*3, HAS GARLIC ODOR. ODOR THRESHOLD: N/A. MATLS TO AVOID: CHLORATES, IODATES, PEROXIDES, LITHIUM, NACL*3, KMNO*3, RB*2C*2, AGNO*4, NOCL, IF*5, CRO*3, CLF*3, CLO, BRF*3, BRF*5, BRN*3, RBC*3BCH, CSC*3BCH.

Section 13 - Disposal Considerations**ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE**

Waste Disposal Methods:

SOLID WASTES SHOULD BE VITRIFIED, PLACED IN LABELED CNTNR & BURIED IN EPA SUPERVISED FACILITY. ETCHING SOLNS & CUTTING WASTES SHOULD BE PRECIPITATED, CEMENTED/VITRIFIED & PLACED IN METAL/PLASTIC LABEL ED CNTNRS & BURIED IN EPA SUPERVISED FACILITY. PASS GAS THRU POTASSIUM PERMANGANATE, PRECIPITATE & TREAT AS ABOVE. WASTE MAY BE CONSIDERED (SUPDAT)

Section 14 - MSDS Transport Information**ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE**

Transport Information:

DOT REGULATED: YES. RQ: (NA - PIECES ARE LARGER THAN 100 MICROMETERS IN DIAMETER). IF REGULATED, PROPER SHIPPING NAME: ARSENIC. HAZARD CLASS: (6.1). IDENTIFICATION NO: (UN1558). PACKING GROUP: (III). LABEL REQUIRED: (POISON). INLAND B/L: ARSENIC, 6.1, UN1558, PACKING GROUP II, POISON. EMERGENCY RESPONSE GUIDE NO: (152).

Section 15 - Regulatory Information**ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE**

SARA Title III Information:

SARA TITLE III, SECT 313: LISTED.

Federal Regulatory Information:

TSCA: WE CERTIFY THAT ALL COMPONENTS OF THIS PRODUCT ARE REGISTERED UNDER THE REGULATIONS OF THE TOXIC SUBSTANCES CONTROL ACT. HMIS: HEALTH (4); FLAMMABILITY (0); REACTIVITY (1).

State Regulatory Information:

Section 16 - Other Information**ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE**

Other Information:

WASTE DISP METH: HAZARDOUS DEPENDING ON LEVEL OF TOXICITY CHARACTERISTIC OF ARSENIC. SEE 40 CFR 261.24 FOR DETERMINATION. RCRA HAZARDOUS WASTE: YES RCRA @: D004; IF TESTED POSITIVE AS CHARACTER OF TOXICITY FOR ARSENIC. CERCLA: YES. RQ (1 LB RQ IS APPLICABLE ONLY IF DIAMETER OF PIECES OF SOLID METAL RELEASED IS LESS THAN 100 MICROMETERS OR 0.004 INCH. THIS PROD FORM IS LARGER THAN 100 MICROMETERS & HAS NO RQ IN ITS CURRENT FORM. IF AS HAZ WASTE CHARACTER OF ARSENIC, THEN RQ=1LB. FOLLOW ALL LOCAL, STATE AND FEDERAL INFO & REGULATIONS.

HAZCOM Label Information

Product Identification: ARSENIC METAL-MBE CHARGES, ARSENIC CHUNK & GRANULE
CAGE: 87730

Assigned Individual: N

Company Name: UNITED MINERAL & CHEMICAL CORP

Company PO Box:

Company Street Address1: 1100 VALLEYBROOK AVE

Company Street Address2: LYNDHURST, NJ 07071 US

Health Emergency Telephone: (800)424-9300

Label Required Indicator: Y

Date Label Reviewed: 09/01/1999

Status Code: A

Manufacturer's Label Number:

Date of Label:

Year Procured: N/K

Organization Code: F

Chronic Hazard Indicator: Y

Eye Protection Indicator: YES

Skin Protection Indicator: YES

Respiratory Protection Indicator: YES

Signal Word: DANGER

Health Hazard: Severe

Contact Hazard: Severe

Fire Hazard: None

Reactivity Hazard: Slight

8/9/2002 10:40:46 AM

SAFETY DATA SHEET



Benzene

Section 1. Identification

GHS product identifier	: Benzene
Chemical name	: benzene
Other means of identification	: benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol
Product use	: Synthetic/Analytical chemistry.
Synonym	: benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol
SDS #	: 001062
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Emergency telephone number (with hours of operation)	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE LIQUIDS - Category 2 SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2 GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (bone marrow) - Category 1

GHS label elements

Hazard pictograms



Signal word

: Danger

Hazard statements

: Highly flammable liquid and vapor.
May form explosive mixtures with air.
Causes serious eye irritation.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
Causes damage to organs through prolonged or repeated exposure. (bone marrow)

Precautionary statements

General

: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Date of issue/Date of revision

: 4/26/2015.

Date of previous issue

: 10/16/2014.

Version : 0.03

1/14

Section 2. Hazards identification

- Prevention** : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
- Response** : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
- Storage** : Store locked up. Store in a well-ventilated place. Keep cool.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Hazards not otherwise classified** : None known.

Section 3. Composition/information on ingredients

- Substance/mixture** : Substance
- Chemical name** : benzene
- Other means of identification** : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

CAS number/other identifiers

- CAS number** : 71-43-2
- Product code** : 001062

Ingredient name	%	CAS number
benzene	100	71-43-2

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Section 4. First aid measures

- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : Causes skin irritation.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : Harmful if swallowed. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO₂, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
benzene	<p>ACGIH TLV (United States, 3/2012). Absorbed through skin. STEL: 8 mg/m³ 15 minutes. STEL: 2.5 ppm 15 minutes. TWA: 1.6 mg/m³ 8 hours. TWA: 0.5 ppm 8 hours.</p> <p>NIOSH REL (United States, 1/2013). STEL: 1 ppm 15 minutes. TWA: 0.1 ppm 10 hours.</p> <p>OSHA PEL (United States, 6/2010). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours.</p> <p>OSHA PEL Z2 (United States, 11/2006). AMP: 50 ppm 10 minutes. CEIL: 25 ppm TWA: 10 ppm 8 hours.</p>

Section 8. Exposure controls/personal protection

Appropriate engineering controls	: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.
Individual protection measures	
Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
Skin protection	
Hand protection	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
Other skin protection	: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	: Liquid. [Watery liquid.]
Color	: Colorless. Yellowish.
Molecular weight	: 78.12 g/mole
Molecular formula	: C ₆ H ₆
Boiling/condensation point	: 80.09°C (176.2°F)
Melting/freezing point	: 5.49°C (41.9°F)
Critical temperature	: 288.95°C (552.1°F)
Odor	: Characteristic.
Odor threshold	: Not available.

Section 9. Physical and chemical properties

pH	: Not available.
Flash point	: Closed cup: -11°C (12.2°F)
Burning time	: Not applicable.
Burning rate	: Not applicable.
Evaporation rate	: 3.5 (butyl acetate = 1)
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 1.2% Upper: 7.8%
Vapor pressure	: 10 kPa (75.006094245 mm Hg) [room temperature]
Vapor density	: 2.7 (Air = 1)
Specific Volume (ft³/lb)	: 1.1403
Gas Density (lb/ft³)	: 0.877 (20°C / 68 to °F)
Relative density	: 0.88
Solubility	: Not available.
Solubility in water	: 1.88 g/l
Partition coefficient: n-octanol/water	: 2.13
Auto-ignition temperature	: 498°C (928.4°F)
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Dynamic (room temperature): 0.604 mPa·s (0.604 cP)

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatibility with various substances	: Highly reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
benzene	LC50 Inhalation Gas. LD50 Oral	Rat Rat	10000 ppm 930 mg/kg	7 hours -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
benzene	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
benzene	Category 1	Not determined	bone marrow

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Section 11. Toxicological information

- Skin contact** : Causes skin irritation.
- Ingestion** : Harmful if swallowed. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Not available.

- General** : Causes damage to organs through prolonged or repeated exposure.
- Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** : May cause genetic defects.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Section 12. Ecological information

Product/ingredient name	LogP _{ow}	BCF	Potential
benzene	2.13	11	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.






Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Benzene (I,T)	71-43-2	Listed	U019

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1114	UN1114	UN114	UN1114	UN1114
UN proper shipping name	BENZENE	BENZENE	BENZENE	BENZENE	BENZENE
Transport hazard class(es)	3 	3 	3 	3 	3 
Packing group	II	II	II	II	II
Environment	No.	No.	No.	No.	No.
Additional information	Reportable quantity 10 lbs / 4.54 kg [1.3675 gal / 5.1767 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	Explosive Limit and Limited Quantity Index 1 Passenger Carrying Road or Rail Index 5	-	-	Passenger and Cargo Aircraft Quantity limitation: 5 L Cargo Aircraft Only Quantity limitation: 60 L Limited Quantities - Passenger Aircraft Quantity limitation: 1 L

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Section 14. Transport information

	<p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: 5 L</p> <p>Cargo aircraft Quantity limitation: 60 L</p> <p>Special provisions IB2, T4, TP1</p>				
--	---	--	--	--	--

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.
Clean Water Act (CWA) 307: benzene
Clean Water Act (CWA) 311: benzene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
benzene	100	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	benzene	71-43-2	100
Supplier notification	benzene	71-43-2	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

- Massachusetts** : This material is listed.
New York : This material is listed.
New Jersey : This material is listed.
Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)

- Canada inventory** : This material is listed or exempted.

International regulations

- International lists** : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

- Chemical Weapons Convention List Schedule I Chemicals** : Not listed

- Chemical Weapons Convention List Schedule II Chemicals** : Not listed

- Chemical Weapons Convention List Schedule III Chemicals** : Not listed

Canada

Section 15. Regulatory information

WHMIS (Canada) : Class B-2: Flammable liquid
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).
CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class B-2: Flammable liquid
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)

Health	*	2
Flammability		3
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

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Section 16. Other information

Key to abbreviations

- : ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- UN = United Nations
- ACGIH – American Conference of Governmental Industrial Hygienists
- AIHA – American Industrial Hygiene Association
- CAS – Chemical Abstract Services
- CEPA – Canadian Environmental Protection Act
- CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
- CFR – United States Code of Federal Regulations
- CPR – Controlled Products Regulations
- DSL – Domestic Substances List
- GWP – Global Warming Potential
- IARC – International Agency for Research on Cancer
- ICAO – International Civil Aviation Organisation
- Inh – Inhalation
- LC – Lethal concentration
- LD – Lethal dosage
- NDSL – Non-Domestic Substances List
- NIOSH – National Institute for Occupational Safety and Health
- TDG – Canadian Transportation of Dangerous Goods Act and Regulations
- TLV – Threshold Limit Value
- TSCA – Toxic Substances Control Act
- WEEL – Workplace Environmental Exposure Level
- WHMIS – Canadian Workplace Hazardous Material Information System

References

- : Not available.

 Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Based on Directive 2001/58/EC et seq. of the Commission of the European Communities

BENZO[b]FLUORANTHENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: benz[e]acephenanthrylene

CAS No.	: 205-99-2	BCR number	: BCR-47
EC index No.	: 601-034-00-4	NFPA code	: N.D.
EINECS No.	: 205-911-9	Molecular weight	: 252.32
RTECS No.	: CU1400000	Formula	: C ₂₀ H ₁₂

1.2 Use of the substance or the preparation:

Certified reference material for laboratory use only

1.3 Company/undertaking identification:

Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:

+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
benzo[b]fluoranthene	205-99-2 205-911-9	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:

- Consult a doctor/medical service if irritation persists
- Rinse immediately with water
- Do not apply neutralizing agents

4.2 Skin contact:

- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Remove clothing before washing
- Do not apply (chemical) neutralizing agents

4.3 After inhalation:

- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:

- Consult a doctor/medical service if you feel unwell

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Technische Schoolstraat 43 A, B-2440 Geel
☎ +32 14 58 45 47 <http://www.big.be> E-mail: info@big.be

1 / 8

MSDS established :
Reference number : BIG\18244GB
Reason for revision : Directive 2001/58/EC

Revision date : 28-02-2002
Revision number : 001

BENZO[b]FLUORANTHENE

- Immediately give lots of water to drink
- Never give water to an unconscious person
- Do not induce vomiting

BENZO[b]FLUORANTHENE

5. Fire-fighting measures

- 5.1 **Suitable extinguishing media:**
- Water spray
 - Polymer foam
 - ABC powder
 - Carbon dioxide
- 5.2 **Unsuitable extinguishing media:**
- Solid water jet ineffective as extinguishing medium
- 5.3 **Special exposure hazards:**
- Not easily combustible
 - Upon combustion CO and CO₂ are formed
- 5.4 **Instructions:**
- Take account of toxic firefighting water
 - Use firefighting water moderately and contain it
- 5.5 **Special protective equipment for firefighters:**
- Heat/fire exposure: compressed air/oxygen apparatus
 - Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

- 6.1 **Personal protection/precautions:** see 8.1/8.3/10.3
- 6.2 **Environmental precautions:**
- Prevent soil and water pollution
 - Substance must not be discharged into the sewer
 - Dam up the solid spill
- 6.3 **Methods for cleaning up:**
- Stop dust cloud by covering with sand/earth
 - Carefully collect the spill/leftovers
 - Scoop solid spill into closing containers
 - Take collected spill to manufacturer/competent authority
 - Clean contaminated surfaces with an excess of water
 - Wash clothing and equipment after handling

7. Handling and storage

- 7.1 **Handling:**
- Observe strict hygiene
 - Avoid prolonged and repeated contact with skin
 - Avoid raising dust
 - Do not discharge the waste into the drain
 - Clean contaminated clothing
- 7.2 **Storage:**
- Keep container tightly closed.
 - Store in a cool area
 - Store in a dry area
 - Store in a dark area
 - Keep away from: heat sources, ignition sources, oxidizing agents, acids
- | | | | | |
|--------------------------------|---|------|----|----|
| Storage temperature | : | N.D. | °C | |
| Quantity limits | : | N.D. | | kg |
| Storage life | : | N.D. | | |
| Materials for packaging | : | N.D. | | |
- 7.3 **Specific uses:** N.D.

BENZO[b]FLUORANTHENE

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA : not listed
TLV-STEL : not listed
TLV-Ceiling : not listed

OES-LTEL : not listed
OES-STEL : not listed
MEL-LTEL : not listed
MEL-STEL : not listed

MAK : not listed
TRK : not listed

MAC-TGG 8 h : not listed
MAC-TGG 15 min. : not listed
MAC-Ceiling : not listed

VME-8 h : not listed
VLE-15 min. : not listed

GWBB-8 h : not listed
GWK-15 min. : not listed
Momentary value : not listed

Sampling methods:

- Benzo(b)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5515
- Benzo(b)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5506

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see 13

8.3 Personal protection:

8.3.1 respiratory protection:

- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:

- Gloves
- Suitable materials: No data available
- Breakthrough time: N.D.

8.3.3 eye protection:

- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:

- Protective clothing
- In case of dust production: head/neck protection
- Suitable materials: No data available

BENZO[b]FLUORANTHENE

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	: Crystalline solid / Needles
Odour	: Odourless
Colour	: Colourless to off-white

9.2 Important health, safety and environmental information:

pH value	: N.D.	
Boiling point/boiling range	: N.D.	°C
Flashpoint	: N.D.	°C
Explosion limits	: N.D.	vol% (°C)
Vapour pressure (at 20°C)	: 0.00000067	hPa
Vapour pressure (at 50°C)	: N.D.	hPa
Relative density (at 20°C)	: N.D.	
Water solubility	: 0.00000012	g/100 ml
Soluble in	: Acetone, oils/fats	
Relative vapour density	: N.D.	
Viscosity	: N.D.	Pa.s
Partition coefficient n-octanol/water	: 6.57	
Evaporation rate		
ratio butyl acetate	: N.D.	
ratio ether	: N.D.	

9.3 Other information:

Melting point/melting range	: 168	°C
Auto-ignition point	: N.D.	°C
Saturation concentration	: N.D.	g/m ³

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:

- Stable under normal conditions

10.2 Materials to avoid:

- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:

- Upon combustion CO and CO₂ are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

BENZO[b]FLUORANTHENE

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	: N.D.	mg/kg
LD50 dermal rat	: N.D.	mg/kg
LD50 dermal rabbit	: N.D.	mg/kg
LC50 inhalation rat	: N.D.	mg/l/4 h
LC50 inhalation rat	: N.D.	ppm/4 h

11.2 Chronic toxicity:

benzo[b]fluoranthene

EC carc. cat.	: 2
EC muta. cat.	: not listed
EC repr. cat.	: not listed
Carcinogenicity (TLV)	: A2
Carcinogenicity (MAC)	: K
Carcinogenicity (VME)	: not listed
Carcinogenicity (GWBB)	: not listed
Carcinogenicity (MAK)	: 2
Mutagenicity (MAK)	: not listed
Teratogenicity (MAK)	: -
IARC classification	: 2B

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

- AFTER SKIN CONTACT
Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- Not classified as toxic to reproduction (EC)
- ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
No specific information available
- SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
Feeling of weakness
Cracking of the skin
Skin rash/inflammation
Photoallergy
Skin cancer
Lung tissue affection/degeneration
Enlargement/affection of the liver
Affection of the renal tissue

BENZO[b]FLUORANTHENE

12. Ecological information

12.1 Ecotoxicity:

- - No data available

12.2 Mobility:

- Volatile organic compounds (VOC): 0%
- Photolysis in water
- Forming sediments in water
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- | | | | |
|-----------------------------------|---|--------------------------------------|--------|
| - biodegradation BOD ₅ | : | N.D. | % ThOD |
| - water | : | - Not readily biodegradable in water | |
| | | - test: E 1/2 > 100 d. | |
| - soil | : | T 1/2: > 87 | days |

12.4 Bioaccumulative potential:

- log P_{ow} : 6.57
- BCF : 168 h : 2800 (LAMELLIBRANCHIATA)
- Highly bioaccumulative

12.5 Other adverse effects:

- WGK : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- Effect on the ozone layer : Not dangerous for the ozone layer (Council Regulation (EC) No 3093/94, O.J. L333 of 22/12/94)
- Greenhouse effect : no data available
- Effect on waste water purification : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 201/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC, O.J. L331 of 15/12/2001)

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

BENZO[b]FLUORANTHENE

14. Transport information

90

3077

14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (benz[e]acephenanthrylene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

BENZO[b]FLUORANTHENE

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Toxic



Dangerous for the environment

- R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
- S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
* = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

- R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:

TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:

K : List of the carcinogenic substances and processes - The Netherlands 2002

BCR-048R: benzo[k]fluoranthene

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Product name: BCR-048R: benzo[k]fluoranthene
CAS number 207-08-9
EC index number 601-036-00-5
EINECS number 205-916-6
RTECS number DF6350000
Molecular mass 252.32 g/mol
Formula C20H12

1.2 Use of the substance/preparation:

Certified reference material for laboratory use only

1.3 Company/undertaking identification:

Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel: +32 14 57 12 11
Fax: +32 14 59 04 06
JRC-IRMM-RM-Sales@ec.europa.eu

1.4 Emergency telephone:

Poison Centre: +32 70 245 245

2. Hazards identification

NFPA: 1-1-2(*)

DSD/DPD

May cause cancer
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Other hazards

Its dust is explosive with air
Dust cloud can be ignited by a spark
Slightly irritant to skin
Slightly irritant to eyes
Caution! Substance is absorbed through the skin
No certainty about human mutagenic properties
Highly bioaccumulative
Not readily biodegradable in water

CLP

Carc. 1B May cause cancer. (H350)
Aquatic Acute 1 Very toxic to aquatic life. (H400)
Aquatic Chronic 1 Very toxic to aquatic life with long lasting effects. (H410)

Other hazards

Its dust is explosive with air
Dust cloud can be ignited by a spark
Slightly irritant to skin
Slightly irritant to eyes
Caution! Substance is absorbed through the skin
No certainty about human mutagenic properties
Highly bioaccumulative
Not readily biodegradable in water

BCR-048R: benzo[k]fluoranthene

3. Composition/information on ingredients

Name	CAS No EINECS/ELINCS	Conc.	Classification according to DSD/DPD	Classification according to CLP	Note
benzo[k]fluoranthene	207-08-9 205-916-6		Carc. Cat. 2; R45 N; R50-53	Carc. 1B; H350 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	

4. First aid measures

4.1 After inhalation:

Remove the victim into fresh air
Respiratory problems: consult a doctor/medical service

4.2 Skin contact:

Rinse with water
Do not apply (chemical) neutralizing agents
Take victim to a doctor if irritation persists

4.3 Eye contact:

Rinse with water
Do not apply neutralizing agents
Take victim to an ophthalmologist if irritation persists

4.4 After ingestion:

Rinse mouth with water
Immediately after ingestion: give lots of water to drink
Do not induce vomiting
Consult a doctor/medical service if you feel unwell

5. Fire-fighting measures

5.1 Suitable extinguishing media:

Water spray
Polyvalent foam
ABC powder
Carbon dioxide

5.2 Unsuitable extinguishing media:

No unsuitable extinguishing media known

5.3 Special exposure hazards:

Heating increases the fire hazard
Dust cloud can be ignited by a spark
Upon combustion CO and CO₂ are formed

5.4 Instructions:

Take account of toxic fire-fighting water
Use water moderately and if possible collect or contain it

5.5 Special protective equipment for fire-fighters:

Gloves
Protective clothing
Heat/fire exposure: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal precautions:

See heading 8.2

6.2 Environmental precautions:

Dam up the solid spill
Prevent soil and water pollution
Prevent spreading in sewers

BCR-048R: benzo[k]fluoranthene

See heading 13

6.3 Methods for cleaning up:

- Scoop solid spill into closing containers
- Carefully collect the spill/leftovers
- Clean contaminated surfaces with an excess of water
- Take collected spill to manufacturer/competent authority
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:

- Avoid raising dust
- Warning! Avoid exposure
- Keep away from naked flames/heat
- Obtain special instructions before use
- Observe strict hygiene
- Keep container tightly closed
- Do not discharge the waste into the drain

7.2 Storage:

Safe storage requirements:

- Store in a cool area
- Store in a dry area
- Keep container in a well-ventilated place
- Keep locked up
- Unauthorized persons are not admitted
- Meet the legal requirements

Keep away from:

- oxidizing agents
- (strong) acids

7.3 Specific use(s):

See information supplied by the manufacturer for the identified use(s)

8. Exposure controls/Personal protection

8.1 Exposure limit values:

8.1.1 Occupational exposure:

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods:

Product name	Test	Number	Sampling method	Remarks
Benz(a)Anthracene	OSHA	CSI		
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5506	adsorption tubes	
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5515	adsorption tubes	

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

- Measure the concentration in the air regularly
- Carry operations in the open/under local exhaust/ventilation or with respiratory protection
- Personal protective equipment:

a) Respiratory protection:

Dust production: dust mask with filter type P3

b) Hand protection:

Gloves

c) Eye protection:

Safety glasses

In case of dust production: protective goggles

d) Skin protection:

Protective clothing

8.2.2 Environmental exposure controls:

BCR-048R: benzo[k]fluoranthene

See headings 6.2, 6.3 and 13

9. Physical and chemical properties

9.1 General information:

Physical form	Crystalline solid
	Needles
Colour	Light yellow

9.2 Important health, safety and environmental information:

Boiling point	480 °C
Vapour pressure (20°C)	< 0.00001 hPa
Solubility in water	< 0.00001 g/100 ml
Solubility in solvents	Soluble in ethanol
	Soluble in acetic acid
	Soluble in oils/fats
Log Pow	6.84

9.3 Other information:

Melting point	217 °C
---------------	--------

10. Stability and reactivity

10.1 Conditions to avoid:

Possible fire hazard

heat sources
ignition sources

Stability

No data available

Reactions

Reacts violently with (strong) oxidizers

10.2 Materials to avoid:

oxidizing agents
(strong) acids

10.3 Hazardous decomposition products:

Upon combustion CO and CO₂ are formed

11. Toxicological information

11.1 Acute toxicity:

No (test) data available.

11.2 Chronic toxicity:

Probably human carcinogenic
No certainty about human mutagenic properties
Not classified as toxic to reproduction (EC)

BCR-048R: benzo[k]fluoranthene

EC carc cat	2
Listed in SZW - List of carcinogenic substances	yes
IARC - classification	2B
MAK - Krebserzeugend Kategorie	2
MAK - Keimzellmutagen Kategorie	3B
MAK - Schwangerschaft Gruppe	-
CLP carc cat	category 1B

11.3 Acute effects/symptoms:

Inhalation:

No data available

Skin contact:

Revision number: 0200

Product number: 49287

Reference number: BCR-048R

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BCR-048R: benzo[k]fluoranthene

Slight irritation

Eye contact:

Slight irritation

Ingestion:

No data available

11.4 Chronic effects:

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:

No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:

Feeling of weakness

Cracking of the skin

Skin rash/inflammation

Photoallergy

Skin cancer

Lung tissue affection/degeneration

Enlargement/affection of the liver

Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

No (test) data available.

12.2 Mobility:

Volatile organic compounds (VOC)

Solubility in/reaction with water

Water physicochemical processes

Soil physicochemical processes

0 %

Insoluble in water

Forming sediments in water

Adsorbs into the soil

12.3 Persistence and degradability:

Water abiotic degradation processes

Half-life soil

Not readily biodegradable in water

Ozonation in water

65 - 1400 days

12.4 Bioaccumulative potential:

Log Pow

Highly bioaccumulative

6.84

12.5 Results of PBT assessment:

Not applicable, based on available data

12.6 Other adverse effects:

Not dangerous for the ozone layer (Council Regulation (EC) no 1005/2009)

13. Disposal considerations

13.1 Provisions relating to waste:

Waste material code (Directive 2008/98/EC, decision 2001/118/EC)

16 05 06* : laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals

Depending on branch of industry and production process, also other EURAL codes may be applicable

Hazardous waste according to Directive 2008/98/EC

13.2 Disposal methods:

Dissolve or mix with a combustible solvent

Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber with energy recovery

Remove waste in accordance with local and/or national regulations

Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001)

13.3 Packaging/Container:

Waste material code packaging (Directive 2008/98/EC)

15 01 10* : packaging containing residues of or contaminated by dangerous substances

{13.4 Entsorgung verschmutzter Gebinde:}

BCR-048R: benzo[k]fluoranthene

14. Transport information

ADR

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADR	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Hazard identification number	90
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

RID

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name RID	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

ADNR

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADNR	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

IMO

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name IMO	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Labels	9
Marine pollutant	P
Environmentally hazardous substance mark	yes

ICAO

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ICAO	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Labels	9
Environmentally hazardous substance mark	yes

15. Regulatory information

15.1 EU Legislation:

BCR-048R: benzo[k]fluoranthene

DSD/DPD

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Dangerous for the environment

R-phrases

45	May cause cancer
50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S-phrases

53	Avoid exposure - obtain special instructions before use
45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
60	This material and its container must be disposed of as hazardous waste
61	Avoid release to the environment. Refer to special instructions/safety data sheets.

Additional recommendations

	Restricted to professional users.
--	-----------------------------------

CLP

Classification and labelling according to Regulation (EC) No 1272/2008 – Annex VI and after evaluation of available test data



Signal word

Dgr	Danger
-----	--------

H-statements

H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

P-statements

P202	Do not handle until all safety precautions have been read and understood.
P281	Use personal protective equipment as required.
P273	Avoid release to the environment.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P391	Collect spillage.
P405	Store locked up.

Supplemental information

	Restricted to professional users.
--	-----------------------------------

15.2 National provisions:

15.3 Specific community rules:

Enumerated in Annex XVII of Regulation (EC) No. 1907/2006: Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.

Legislation

EG/552/2009

EG/552/2009

Reference legislation

See column 1: 28.

See column 1: 50. g)

16. Other information

BCR-048R: benzo[k]fluoranthene

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question.

Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult your BIG licence agreement for details.

(*) = INTERNAL CLASSIFICATION (NFPA)

PBT-substances = persistent, bioaccumulative and toxic substances

DSD Dangerous Substance Directive
DPD Dangerous Preparation Directive
CLP (EU-GHS) Classification, labelling and packaging (Globally Harmonised System in Europe)

Full text of any R-phrases referred to under headings 2 and 3:

R45	May cause cancer
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Full text of any H-statements referred to under headings 2 and 3:

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of any classes referred to under headings 2 and 3:

Aquatic Acute	Hazardous to the aquatic environment - acute
Aquatic Chronic	Hazardous to the aquatic environment - chronic
Carc.	Carcinogenicity

SAFETY DATA SHEET

Based on Directive 2001/58/EC et seq. of the Commission of the European Communities

BENZ[a]ANTHRACENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: benzo(a)anthracene

CAS No.	: 56-55-3	BCR number	: BCR-271
EC index No.	: 601-033-00-9	NFPA code	: N.D.
EINECS No.	: 200-280-6	Molecular weight	: 228.30
RTECS No.	: CV9275000	Formula	: C18H12

1.2 Use of the substance or the preparation:

Certified reference material for laboratory use only

1.3 Company/undertaking identification:

Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:

+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
Benzo[a]anthracene	56-55-3 200-280-6	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:

- Consult a doctor/medical service if irritation persists
- Rinse immediately with water

4.2 Skin contact:

- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Remove clothing before washing

4.3 After inhalation:

- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:

- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person

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Technische Schoolstraat 43 A, B-2440 Geel
☎ +32 14 58 45 47 <http://www.big.be> E-mail: info@big.be

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MSDS established :
Reference number : BIG\18241GB
Reason for revision : Directive 2001/58/EC
Revision date : 28-03-2002
Revision number : 001

BENZ[a]ANTHRACENE

BENZ[a]ANTHRACENE

5. Fire-fighting measures

5.1 Suitable extinguishing media:

- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:

- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:

- Not easily combustible
- Upon combustion CO and CO₂ are formed

5.4 Instructions:

- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:

- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see heading 8.1/8.3/10.3

6.2 Environmental precautions:

- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:

- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:

- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

7.2 Storage:

- Keep container tightly closed. Store in a cool area. Store in a dry area.
- Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature	: N.D.	°C
Quantity limits	: N.D.	kg
Storage life	: N.D.	
Materials for packaging	:	
- suitable	:no data available	
- to avoid	:no data available	

7.3 Specific uses:

See information supplied by the manufacturer

BENZ[a]ANTHRACENE

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA	:	mg/m ³	-	ppm
TLV-STEL	:	mg/m ³	-	ppm
TLV-Ceiling	:	mg/m ³		ppm
OES-LTEL	:	mg/m ³		ppm
OES-STEL	:	mg/m ³		ppm
MAK	:	mg/m ³		ppm
TRK	:	mg/m ³		ppm
MAC-TGG 8 h	:	mg/m ³		
MAC-TGG 15 min.	:	mg/m ³		
MAC-Ceiling	:	mg/m ³		
VME-8 h	:	mg/m ³		ppm
VLE-15 min.	:	mg/m ³		ppm
GWBB-8 h	:	mg/m ³		ppm
GWK-15 min.	:	mg/m ³		ppm
Momentary value	:	mg/m ³		ppm
EC	:	mg/m ³		ppm
EC-STEL	:	mg/m ³		ppm

Sampling methods:

- Benz(a)Anthracene (Polynuclear aromatic hydrocarbons) NIOSH 5506
- Benz(a)Anthracene (Polynuclear aromatic hydrocarbons) NIOSH 5515
- Benz(a)Anthracene OSHA CSI

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see heading 13

8.3 Personal protection:

8.3.1 respiratory protection:

- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:

- Gloves
- Suitable materials: No data available
- Breakthrough time: N.D.

8.3.3 eye protection:

- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:

- Protective clothing
- In case of dust production: head/neck protection
- Suitable materials: No data available

BENZ[a]ANTHRACENE

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	: Crystalline solid / Scales
Odour	: Odourless
Colour	: Colourless to fluorescent yellow-green

9.2 Important health, safety and environmental information:

pH value	: N.D.	
Boiling point/boiling range	: N.A.	°C
Flashpoint	: N.D.	°C
Explosion limits	: N.D.	vol% (°C)
Vapour pressure (at 20°C)	: 0.00007	hPa
Vapour pressure (at 50°C)	: N.D.	hPa
Relative density (at 20°C)	: 1.3	
Water solubility	: 0.00001	g/100 ml
Soluble in	: Ether, acetone, oils/fats	
Relative vapour density	: N.D.	
Viscosity	: N.D.	Pa.s
Partition coefficient n-octanol/water	: 5.61/5.79	
Evaporation rate		
ratio to butyl acetate	: N.D.	
ratio to ether	: N.D.	

9.3 Other information:

Melting point/melting range	: 160	°C
Auto-ignition point	: N.D.	°C
Saturation concentration	: N.D.	g/m ³

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:

- Stable under normal conditions

10.2 Materials to avoid:

- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:

- Upon combustion CO and CO₂ are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	: N.D.	mg/kg
LD50 dermal rat	: N.D.	mg/kg
LD50 dermal rabbit	: N.D.	mg/kg
LC50 inhalation rat	: N.D.	mg/l/4 h
LC50 inhalation rat	: N.D.	ppm/4 h

BENZ[a]ANTHRACENE

11.2 Chronic toxicity:

EC carc. cat. : 2
EC muta. cat. : not listed
EC repr. cat. : not listed

Carcinogenicity (TLV) : A2
Carcinogenicity (MAC) : K
Carcinogenicity (VME) : not listed
Carcinogenicity (GWBB) : not listed

Carcinogenicity (MAK) : 2
Mutagenicity (MAK) : not listed
Teratogenicity (MAK) : -

IARC classification : 2A

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER SKIN CONTACT
- Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- Mutagenicity: AMES test positive
- Probably human mutagenic

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Photoallergy
- Skin rash/inflammation
- Cracking of the skin
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- LC50 (65 h) : 0.0018 mg/l (PIMEPHALES PROMELAS)
- EC50 (96 h) : 0.01 mg/l (DAPHNIA PULEX)

12.2 Mobility:

- Volatile organic compounds (VOC): 0%
- Photolysis in water
- Ozonation in water
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- biodegradation BOD₅ : N.D. % ThOD
- water : - Not readily biodegradable in water
- soil : T $\frac{1}{2}$: > 100 days

12.4 Bioaccumulative potential:

- log P_{ow} : 5.61/5.79
- BCF : 72 h : 350 (LEUCISCUS IDUS)
- Highly bioaccumulative

BENZ[a]ANTHRACENE

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC)

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

BENZ[a]ANTHRACENE

14. Transport information

90

3077

14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (benzo[a]anthracene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport

: none

14.8 Limited quantities (LQ)

:

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:

each package shall display a diamond-shaped figure with the following inscription:

- 'UN 3077'

or, in the case of different goods with different identification numbers within a single package:

- the letters 'LQ'

BENZ[a]ANTHRACENE

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Toxic



Dangerous for the environment

- R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
- S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
* = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

- R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:

TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:

K : List of the carcinogenic substances and processes - The Netherlands 2002

Material Safety Data Sheet

Benzo[a]pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[a]pyrene, 98%

Catalog Numbers: AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000 AC377201000

Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.

Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown powder.

Danger! May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Cancer hazard. May cause allergic skin reaction. May cause heritable genetic damage.

Target Organs: Reproductive system, skin.

Potential Health Effects

Eye: May cause eye irritation.

Skin: May cause skin irritation. May be harmful if absorbed through the skin. May cause an allergic reaction in certain individuals.

Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.

Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.

Chronic: May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Flash Point: Not available.

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Benzo[a]pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
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OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder

Appearance: yellow to brown

Odor: faint aromatic odor

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate:Not available.

Viscosity: Not available.

Boiling Point: 495 deg C @ 760 mm Hg

Freezing/Melting Point:175 - 179 deg C

Decomposition Temperature:Not available.

Solubility: 1.60x10⁻³ mg/l @25°C

Specific Gravity/Density:Not available.

Molecular Formula:C₂₀H₁₂

Molecular Weight:252.31

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Dust generation.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 50-32-8: DJ3675000

LD50/LC50:

Not available.

Carcinogenicity:

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found

Teratogenicity: No information found

Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.

Mutagenicity: Mutagenic effects have occurred in humans. Mutagenic effects have occurred in experimental animals.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
Hazard Class:		9
UN Number:		UN3077
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 50-32-8 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 50-32-8: immediate, delayed.

Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 43 May cause sensitization by skin contact.

R 45 May cause cancer.

R 46 May cause heritable genetic damage.

R 60 May impair fertility.

R 61 May cause harm to the unborn child.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardous waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 50-32-8: No information available.

Canada - DSL/NDSL

CAS# 50-32-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information
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MSDS Creation Date: 9/02/1997

Revision #7 Date: 6/30/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.



SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name Benzo[ghi]perylene

Cat No. : AC105550000; AC105550050; AC105550250; AC105551000

Synonyms 1,12-Benzoperylene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements

None required

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Benzo(ghi)perylene	191-24-2	> 98

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation	Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.
Ingestion	Clean mouth with water. Get medical attention.
Most important symptoms/effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO₂)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
0

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions	See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up	Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.
---	--

7. Handling and storage

Handling	Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist.
Storage	Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
----------------------------	---

Engineering Measures	Ensure adequate ventilation, especially in confined areas.
-----------------------------	--

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	276 - 280 °C / 528.8 - 536 °F
Boiling Point/Range	No information available > @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C22 H12
Molecular Weight	276.33

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable.
Conditions to Avoid	Excess heat. Exposure to light. Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	
Toxicologically Synergistic	No information available

Products**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo(ghi)perylene	191-24-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Benzo(ghi)perylene	7.23

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
-----------	------	-----	------	--------	--------	-----	-------	------	------	-------	------

Benzo(ghi)perylene	-	-	-	205-883-8	-		-	-	-	-	-
--------------------	---	---	---	-----------	---	--	---	---	---	---	---

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations**TSCA 12(b)**

Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benzo(ghi)perylene	191-24-2	> 98	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzo(ghi)perylene	-	-	X	X

Clean Air Act

Not applicable

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzo(ghi)perylene	5000 lb	-

California Proposition 65

This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo(ghi)perylene	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015

Print Date 10-Feb-2015

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 4.6

Revision Date 12/29/2015

Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Beryllium

Product Number : 378135
Brand : Aldrich

CAS-No. : 7440-41-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USATelephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

Acute toxicity, Inhalation (Category 2), H330

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Skin sensitisation (Category 1), H317

Carcinogenicity (Category 1B), H350

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301

Toxic if swallowed.

H315

Causes skin irritation.

H317

May cause an allergic skin reaction.

H319

Causes serious eye irritation.

H330

Fatal if inhaled.

H335

May cause respiratory irritation.

H350

May cause cancer.

H372	Causes damage to organs through prolonged or repeated exposure.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: Be
Molecular weight	: 9.01 g/mol
CAS-No.	: 7440-41-7
EC-No.	: 231-150-7

Hazardous components

Component	Classification	Concentration
Beryllium foil		
	Acute Tox. 3; Acute Tox. 2; Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 1B; STOT SE 3; STOT RE 1; H301, H315, H317, H319, H330, H335, H350, H372	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Beryllium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Components with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
Beryllium foil	7440-41-7	TWA	2.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	25.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	2.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
	Remarks	Z27.29-1970		
		CEIL	5.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium sensitization Chronic beryllium disease (berylliosis) Confirmed human carcinogen Danger of cutaneous absorption Sensitizer		
		C	0.000500 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	2.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	2.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000 microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium sensitization		

		Chronic beryllium disease (berylliosis) Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Confirmed human carcinogen Danger of cutaneous absorption Sensitizer		
		C	0.000500 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	2microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		C	0.0005 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: powder Colour: grey
b) Odour	odourless
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 1,278 °C (2,332 °F) - lit.
f) Initial boiling point and boiling range	2,970 °C (5,378 °F) - lit.
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	1.85 g/cm ³ at 25 °C (77 °F)
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Alkali metals

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

LD50 Intravenous - Rat - 0.496 mg/kg

Remarks: Liver:Hepatitis (hepatocellular necrosis), zonal.

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Hamster

Lungs

Result: negative

Carcinogenicity

Carcinogenicity - Rat - Intratracheal

Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Carcinogenicity - Rabbit - Intravenous

Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Beryllium foil)

NTP: Known to be human carcinogen (Beryllium foil)

Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Beryllium foil)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DS1750000

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium, powder
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1567 Class: 6.1 (4.1) Packing group: II EMS-No: F-G, S-G
Proper shipping name: BERYLLIUM POWDER

IATA

UN number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium powder

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Beryllium foil	7440-41-7	1993-04-24

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Beryllium foil	CAS-No. 7440-41-7	Revision Date 1993-04-24
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Pennsylvania Right To Know Components

Beryllium foil	CAS-No. 7440-41-7	Revision Date 1993-04-24
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New Jersey Right To Know Components

Beryllium foil	CAS-No. 7440-41-7	Revision Date 1993-04-24
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California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

Beryllium foil	CAS-No. 7440-41-7	Revision Date 2008-10-10
----------------	----------------------	-----------------------------

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H301	Toxic if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
Skin Irrit.	Skin irritation
Skin Sens.	Skin sensitisation

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	3
Reactivity Hazard:	3

Further information

Copyright 2015 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

SAFETY DATA SHEET

Version 5.11
Revision Date 06/18/2015
Print Date 02/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Bis(2-ethylhexyl) phthalate

Product Number : 80030
Brand : Sigma-Aldrich
Index-No. : 607-317-00-9

CAS-No. : 117-81-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)
H360

May damage fertility or the unborn child.

Precautionary statement(s)

P201 : Obtain special instructions before use.
P202 : Do not handle until all safety precautions have been read and understood.
P281 : Use personal protective equipment as required.
P308 + P313 : IF exposed or concerned: Get medical advice/ attention.
P405 : Store locked up.
P501 : Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Endocrine disrupting chemical(s)

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 'Diocetyl' phthalate
Phthalic acid bis(2-ethylhexyl ester)
DEHP

Formula : C₂₄H₃₈O₄
Molecular weight : 390.56 g/mol
CAS-No. : 117-81-7
EC-No. : 204-211-0
Index-No. : 607-317-00-9
Registration number : 01-2119484611-38-XXXX

Hazardous components

Component	Classification	Concentration
bis(2-Ethylhexyl) phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Repr. 1B; H360	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
bis(2-Ethylhexyl) phthalate	117-81-7	TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lower Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 480 min

Material tested: Dermatrill® P (KCL 743 / Aldrich Z677388, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 230 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | -50.0 °C (-58.0 °F) |
| f) Initial boiling point and boiling range | 386 °C (727 °F) - lit. |
| g) Flash point | 207.0 °C (404.6 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | Lower explosion limit: 0.3 %(V) |
| k) Vapour pressure | 1.6 hPa (1.2 mmHg) at 93.0 °C (199.4 °F) |
| l) Vapour density | No data available |
| m) Relative density | 0.985 g/cm ³ at 20 °C (68 °F) |
| n) Water solubility | insoluble |

- | | |
|---|---------------------|
| o) Partition coefficient: n-octanol/water | No data available |
| p) Auto-ignition temperature | 390.0 °C (734.0 °F) |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 30,000 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 25,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig

Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (bis(2-Ethylhexyl) phthalate)
NTP: Reasonably anticipated to be a human carcinogen (bis(2-Ethylhexyl) phthalate)
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

May cause congenital malformation in the fetus.
Presumed human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: TI0350000

Effects due to ingestion may include:, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.67 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - > 0.32 mg/l - 96 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - > 0.17 mg/l - 96 h
	LC50 - Lepomis macrochirus (Bluegill) - > 0.20 mg/l - 96 h
	NOEC - other fish - > 0.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 0.16 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	Result: - Readily biodegradable (OECD Test Guideline 301)
------------------	--

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 100 d - 0.014 mg/l
	Bioconcentration factor (BCF): 113 Remarks: Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3082 Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (bis(2-Ethylhexyl) phthalate)

Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2009-02-01

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H360	May damage fertility or the unborn child.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.11

Revision Date: 06/18/2015

Print Date: 02/11/2016

SAFETY DATA SHEET

Version 5.6
Revision Date 12/10/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Carbon disulfide

Product Number : 180173
Brand : Sigma-Aldrich
Index-No. : 006-003-00-3

CAS-No. : 75-15-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), H372
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H225 : Highly flammable liquid and vapour.
H315 : Causes skin irritation.
H319 : Causes serious eye irritation.
H332 : Harmful if inhaled.
H361 : Suspected of damaging fertility or the unborn child.
H372 : Causes damage to organs through prolonged or repeated exposure if inhaled.

H401	Toxic to aquatic life.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: CS ₂
Molecular weight	: 76.14 g/mol
CAS-No.	: 75-15-0
EC-No.	: 200-843-6
Index-No.	: 006-003-00-3

Hazardous components

Component	Classification	Concentration
Carbon disulphide		
	Flam. Liq. 2; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Repr. 2; STOT RE 1; Aquatic Acute 2; H225, H315, H319, H332, H361, H372, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Sulphur oxides

Flash back possible over considerable distance., Container explosion may occur under fire conditions., Vapours may form explosive mixture with air., May explode when heated.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Refrigerate before opening.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Carbon disulphide	75-15-0	TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	1.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	20.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		CEIL	30.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		Peak	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		TWA	1.000000 ppm 3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	10.000000 ppm 30.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		See Table Z-2		
		TWA	20 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		CEIL	30 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		

		Peak	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Carbon disulphide	75-15-0	2-Thiothiazolidine-4-carboxylic acid (TTCA)	0.5000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Colour: colourless
b) Odour	Stench.
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: -112 °C (-170 °F) - lit.
f) Initial boiling point and boiling range	46 °C (115 °F) - lit.
g) Flash point	-30 °C (-22 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 50 %(V) Lower explosion limit: 1.3 %(V)
k) Vapour pressure	394.956 hPa (296.241 mmHg) at 20 °C (68 °F) 1,342.711 hPa (1,007.116 mmHg) at 55 °C (131 °F)
l) Vapour density	2.63 - (Air = 1.0)
m) Relative density	1.266 g/mL at 25 °C (77 °F)
n) Water solubility	2.9 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o) Partition coefficient: n-octanol/water	log Pow: 2.7 at 25 °C (77 °F)
p) Auto-ignition temperature	97 - 107 °C (207 - 225 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Surface tension	71.9 mN/m at 19.5 °C (67.1 °F)
Relative vapour density	2.63 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Alkali metals, Zinc, Amines, Azides, Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - female - > 2,000 mg/kg

(OECD Test Guideline 423)

LC50 Inhalation - Rat - male and female - 4 h - 10.35 mg/l

(OECD Test Guideline 403)

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

- Mouse

Result: Does not cause skin sensitisation.

(OECD Test Guideline 429)

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

Ames test

Salmonella typhimurium

Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Suspected human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: FF6650000

May cause convulsions.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - <i>Poecilia reticulata</i> (guppy) - 4 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - <i>Daphnia magna</i> (Water flea) - 2.1 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - <i>Chlorella pyrenoidosa</i> - 21 mg/l - 96 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: > 80 % - Readily biodegradable (OECD Test Guideline 301D)
------------------	--

12.3 Bioaccumulative potential

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1131 Class: 3 (6.1) Packing group: I
Proper shipping name: Carbon disulfide
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1131 Class: 3 (6.1) Packing group: I EMS-No: F-E, S-D
Proper shipping name: CARBON DISULPHIDE

IATA

UN number: 1131 Class: 3 (6.1)
Proper shipping name: Carbon disulphide
IATA Passenger: Not permitted for transport
IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.
H401	Toxic to aquatic life.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation

Product Safety – Americas Region

1-800-521-8956

Version: 5.6

Revision Date: 12/10/2015

Print Date: 02/09/2016

1. IDENTIFICATION

Catalog Number / Product Name: 32207, 32207-5XX, & 32307 / alpha-Chlordane Standard
Company: Restek Corporation
Address: 110 Benner Circle
Bellefonte, Pa. 16823
Phone#: 814-353-1300
Fax#: 814-353-1309
Emergency#: 1-800-424-9300 (CHEMTREC)
+1 703-741-5970 (Outside the US)
Email: sds@restek.com
Revision Number: 6
Intended use: For Laboratory use only

2. HAZARD(S) IDENTIFICATION

Emergency Overview:

GHS Hazard Symbols:



GHS Classification:

Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 1
Flammable Liquid Category 2
Acute Toxicity - Inhalation Dust / Mist Category 3
Acute Toxicity - Inhalation Vapour Category 3
Acute Toxicity - Inhalation Gas Category 3
Acute Toxicity - Dermal Category 3
Acute Toxicity - Oral Category 3

GHS Signal Word:

Danger

GHS Hazard:

Highly flammable liquid and vapour.
Toxic if swallowed, in contact with skin or if inhaled.
Toxic if inhaled.
Causes damage to organs.

GHS Precautions:

Safety Precautions:

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilation and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash hands and skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Measures:

IF SWALLOWED: Immediately call a POISON CENTER/doctor/....
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF exposed: Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment see section 4.

Specific measures see section 4.
Rinse mouth.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
In case of fire: Use extinguishing media in section 5 for extinction.

Storage: Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal: Dispose of contents/container according to section 13 of the SDS.

Single Exposure Target Organs: No data available.

Repeated Exposure Target Organs: No data available.

3. COMPOSITION / INFORMATION ON INGREDIENT

Chemical Name	CAS #	EINEC #	% Composition
methanol	67-56-1	200-659-6	99.900000
cis-chlordane	5103-71-9		0.100000

4. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have a trained individual administer oxygen. Get medical attention immediately.

Eyes: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Ingestion: Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this SDS.

5. FIRE- FIGHTING MEASURES

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water may be ineffective but water spray can be used to extinguish a fire if swept across the base of the flames. Water can absorb heat and keep exposed material from being damaged by fire.

Fire and/or Explosion Hazards: Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a fire (Class B). Vapors are heavier than air and may travel to a source of ignition and flash back.

Fire Fighting Methods and Protection: Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment: Exposure to the spilled material may be severely irritating or toxic. Follow personal protective equipment recommendations found in Section 8 of this SDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred, and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits.

Methods for Clean-up: Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal.

evaluation.

7. HANDLING AND STORAGE

Handling Technical Measures and Precautions:	Toxic or severely irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment
Storage Technical Measures and Conditions:	Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
methanol	67-56-1	6000 ppm IDLH	250 ppm STEL	200 ppm TWA	200 ppm TWA; 260 mg/m ³ TWA
cis-chlordane	5103-71-9	ND		No TLV	No data available.

Personal Protection:

Engineering Measures:	Local exhaust ventilation is recommended when generating excessive levels of vapors from handling or thermal processing.
Respiratory Protection:	Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms. If an exposure limit is exceeded or if an operator is experiencing symptoms of inhalation overexposure as explained in Section 3, provide respiratory protection.
Eye Protection:	Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.
Skin Protection:	Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color:	No data available.
Odor:	Mild
Physical State:	No data available.
pH:	No data available
Vapor Density:	1.1 (air = 1)
Melting Point:	-98 °C
Flash Point:	52
Flammability:	Highly Flammable
Upper Flammable/Explosive Limit, % in air:	36.0
Lower Flammable/Explosive Limit, % in air:	6.0
Autoignition Temperature:	464 deg C
Decomposition Temperature:	No data available.
Specific Gravity:	0.791 - 0.792 g/cm ³ at 20 °C
Evaporation Rate:	No data available.
Odor Threshold:	No data available.
Solubility:	Moderate; 50-99%
Partition Coefficient: n-octanol in water:	No data available.
VOC % by weight:	99.90
Molecular Weight:	32.04

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Conditions to Avoid:	No data available.
Materials to Avoid / Chemical Incompatibility:	Strong oxidizing agents
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry:	Inhalation, Skin Contact, Eye Contact, Ingestion
Target Organs Potentially Affected By Exposure:	Eyes, Central nervous system stimulation, Skin, GI Tract, Respiratory Tract
Chemical Interactions That Change Toxicity:	None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation:	Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.
Inhalation Toxicity:	Harmful! Can cause systemic damage (see "Target Organs")Methanol can cause central nervous system depression and overexposure can cause damage to the optic nerve resulting in visual impairment or blindness.
Skin Contact:	Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Eye Contact:	Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.
Ingestion Irritation:	Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.Highly toxic and may be fatal if swallowed.
Ingestion Toxicity:	Toxic if swallowed. May cause target organ failure and/or death.May be fatal if swallowed.

Long-Term (Chronic) Health Effects:

Carcinogenicity:	No data.
Reproductive and Developmental Toxicity:	Contains a known human reproductive and/or developmental hazard.
Inhalation:	Upon prolonged and/or repeated exposure, can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.Harmful! Can cause systemic damage upon prolonged and/or repeated exposure (see "Target Organs")
Skin Contact:	Upon prolonged or repeated contact, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Ingestion:	Toxic if swallowed. May cause target organ failure and/or death.

Component Toxicological Data:**NIOSH:**

Chemical Name	CAS No.	LD50/LC50
Methanol	67-56-1	Oral LD50 Rat 5628 mg/kg (Source: NLM_CIP); Inhalation LC50 Rat 83.2 mg/L 4 h (Source: IUCLID)

Component Carcinogenic Data:**OSHA:**

Chemical Name	CAS No.
No data available.	

ACGIH:

Chemical Name	CAS No.
No data available.	

NIOSH:

Chemical Name	CAS No.
No data available.	

NTP:

Chemical Name	CAS No.
No data available.	

IARC:

Chemical Name	CAS No.	Group No.
No data.		Group 1
No data.		Group 2A
cis-Chlordane	5103-71-9	Group 2B

12. ECOLOGICAL INFORMATION

Overview:	Moderate ecological hazard. This product may be dangerous to plants and/or wildlife.
Mobility:	No data
Persistence:	No data

Bioaccumulation: No data
Degradability: Biodegrades slowly.
Ecological Toxicity Data: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Description of Spent Product: Spent or discarded material is a hazardous waste.
Disposal Methods: Dispose of by incineration following Federal, State, Local, or Provincial regulations.
Waste Disposal of Packaging: Comply with all Local, State, Federal, and Provincial Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:
DOT Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3
Packing Group: II

International:
IATA Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3 (6.1)
Packing Group: II

Marine Pollutant: No

Chemical Name	CAS#	Marine Pollutant	Severe Marine Pollutant
No data available.			

15. REGULATORY INFORMATION

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
methanol	67-56-1	X	X	-	X
cis-chlordane	5103-71-9	X	-	-	-

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Methanol	67-56-1	Prop 65 Develop Tox

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
methanol	67-56-1	X	X	X	X
cis-chlordane	5103-71-9	-	-	-	-

16. OTHER INFORMATION

Prior Version Date: 04/22/14

Disclaimer: Restek Corporation provides the descriptions, data and information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. It is provided for your guidance only. Because many factors may affect processing or application/use, Restek Corporation recommends you perform an assessment to determine the suitability of a product for your particular purpose prior to use. No warranties of any kind, either expressed or implied, including fitness for a particular purpose, are made regarding products described, data or information set forth. In no case shall the descriptions, information, or data provided be considered a part of our terms and conditions of sale. Further, the descriptions, data and information furnished hereunder are given gratis. No obligation or liability for the description, data and information given are assumed. All such being given and accepted at your risk.

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 2015/830 and US OSHA HCS 2015

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

- 1.1 Product Code:** 82220
Product Name: SIN-1 (chloride)
Synonyms: 5-amino-3-(4-morpholinyl)-1,2,3-oxadiazolium chloride; Linsidomine; 3-Morpholino-sydnominine
- 1.2 Relevant identified uses of the substance or mixture and uses advised against:**
Relevant identified uses: For research use only, not for human or veterinary use.
- 1.3 Details of the Supplier of the Safety Data Sheet:**
Company Name: Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108
Web site address: www.caymanchem.com
Information: Cayman Chemical Company +1 (734)971-3335
- 1.4 Emergency telephone number:**
Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
CHEMTREC Outside USA and Canada: +1 (703)527-3887

Section 2. Hazards Identification

- 2.1 Classification of the Substance or Mixture:**
- 2.2 Label Elements:**
GHS Signal Word: None
GHS Hazard Phrases:
Based on evaluation of currently available data this substance or mixture is not classifiable according to GHS.
GHS Precaution Phrases:
No phrases apply.
GHS Response Phrases:
No phrases apply.
GHS Storage and Disposal Phrases:
Please refer to Section 7 for Storage and Section 13 for Disposal information.
- 2.3 Adverse Human Health** Material may be irritating to the mucous membranes and upper respiratory tract.
Effects and Symptoms: May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

CAS # / RTECS #	Hazardous Components (Chemical Name)/ REACH Registration No.	Concentration	EC No./ EC Index No.	GHS Classification
16142-27-1 WU7687800	SIN-1 Chloride	100.0 %	605-254-1 NA	Flam. Sol. 1: H228 Self-React. B: H241 Acute Tox.(O) 4: H302 Skin Sens. 1A: H317 Aquatic (C) 2: H411

Section 4. First Aid Measures

4.1 Description of First Aid Measures:

- In Case of Inhalation:** Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
- In Case of Skin Contact:** Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.
- In Case of Eye Contact:** Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.
- In Case of Ingestion:** Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

- 5.1 Suitable Extinguishing Media:** Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray. Use water spray to cool fire-exposed containers.
- Unsuitable Extinguishing Media:** A solid water stream may be inefficient.
- 5.2 Flammable Properties and Hazards:** No data available.
- Flash Pt:** No data.
- Explosive Limits:** LEL: No data. UEL: No data.
- Autoignition Pt:** No data.
- 5.3 Fire Fighting Instructions:** As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

- 6.1 Protective Precautions, Protective Equipment and Emergency Procedures:** Avoid raising and breathing dust, and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).
- 6.2 Environmental Precautions:** Take steps to avoid release into the environment, if safe to do so.
- 6.3 Methods and Material For Containment and Cleaning Up:** Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

- 7.1 Precautions To Be Taken in Handling:** Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.
- 7.2 Precautions To Be Taken in Storing:** Keep container tightly closed. Store in accordance with information listed on the product insert.

Section 8. Exposure Controls/Personal Protection

8.1 Exposure Parameters:



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SIN-1 (chloride)

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8.2 Exposure Controls:

8.2.1 Engineering Controls Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

8.2.2 Personal protection equipment:

Eye Protection: Safety glasses

Protective Gloves: Compatible chemical-resistant gloves

Other Protective Clothing: Lab coat

Respiratory Equipment NIOSH approved respirator, as conditions warrant.

(Specify Type):

Work/Hygienic/Maintenance Practices: Do not take internally.

Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower.

Wash thoroughly after handling.

No data available.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States: [] Gas [] Liquid [X] Solid

Appearance and Odor: A crystalline solid

pH: No data.

Melting Point: No data.

Boiling Point: No data.

Flash Pt: No data.

Evaporation Rate: No data.

Flammability (solid, gas): No data available.

Explosive Limits: LEL: No data. UEL: No data.

Vapor Pressure (vs. Air or mm Hg): No data.

Vapor Density (vs. Air = 1): No data.

Specific Gravity (Water = 1): No data.

Solubility in Water: No data.

Solubility Notes: ~10 mg/ml in PBS (pH 7.2); ~5 mg/ml in EtOH, DMSO, & DMF;

Octanol/Water Partition Coefficient: No data.

Autoignition Pt: No data.

Decomposition Temperature: No data.

Viscosity: No data.

9.2 Other Information

Percent Volatile: No data.

Molecular Formula & Weight: C₆H₁₁N₄O₂ • Cl 206.6

Section 10. Stability and Reactivity

- 10.1 Reactivity:** No data available.
- 10.2 Stability:** Unstable [] Stable [X]
- 10.3 Stability Note(s):** Stable if stored in accordance with information listed on the product insert.
- Polymerization:** Will occur [] Will not occur [X]
- 10.4 Conditions To Avoid:** No data available.
- 10.5 Incompatibility - Materials To Avoid:** strong oxidizing agents
- 10.6 Hazardous Decomposition or Byproducts:** carbon dioxide
carbon monoxide
hydrogen chloride gas
nitrogen oxides

Section 11. Toxicological Information

- 11.1 Information on Toxicological Effects:** The toxicological effects of this product have not been thoroughly studied.
SIN-1 (chloride) - Toxicity Data: Oral LD50 (mouse): 480 mg/kg; Intraperitoneal LD50 (mouse): 315 mg/kg;
- Chronic Toxicological Effects:** SIN-1 (chloride) - Investigated as a drug and mutagen.
Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here.
See actual entry in RTECS for complete information.
SIN-1 (chloride) RTECS Number: WU7687800

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
16142-27-1	SIN-1 Chloride	n.a.	n.a.	n.a.	n.a.

Section 12. Ecological Information

- 12.1 Toxicity:** Avoid release into the environment.
Runoff from fire control or dilution water may cause pollution.
- 12.2 Persistence and Degradability:** No data available.
- 12.3 Bioaccumulative Potential:** No data available.
- 12.4 Mobility in Soil:** No data available.
- 12.5 Results of PBT and vPvB assessment:** No data available.
- 12.6 Other adverse effects:** No data available.

Section 13. Disposal Considerations

- 13.1 Waste Disposal Method:** Dispose in accordance with local, state, and federal regulations.



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SIN-1 (chloride)

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Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Not dangerous goods.

DOT Hazard Class:

UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Not dangerous goods.

UN Number:

Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
16142-27-1	SIN-1 Chloride	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
16142-27-1	SIN-1 Chloride	CAA HAP, ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No

Regulatory Information Statement: This SDS was prepared in accordance with 29 CFR 1910.1200 and Regulation (EC)

No.1272/2008.

Section 16. Other Information

Revision Date: 12/19/2018

Additional Information About This Product: No data available.

Company Policy or Disclaimer: DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.



Tel: 514-956-7503
Fax: 514-956-7504
Internet: www.megs.ca
Email : support@megs.ca

Montreal
Ottawa
Quebec

St-Laurent
Nepean
Quebec

Tel : 514-956-7503
Tel : 613-226-4228
Tel : 418-834-7447

Fax : 514-956-7504
Fax : 613-226-4229
Fax : 418-834-3774

CHLOROBENZENE- MATERIAL SAFETY DATA SHEET

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24 Hour EMERGENCY CONTACT

**U.S- CHEMTREC 1-800-
424-9300**

**CANADA- CANUTEC 613-
996-6666**

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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Matheson Tri-Gas, Inc.

*The telephone numbers listed below are
emergency numbers, please contact your local
branch for routine inquiries.*

USA

959 Route 46 East
Parsippany, New Jersey
07054-0624 USA
Phone: 973-257-1100

CANADA

530 Watson Street
Whitby, Ontario
L1N 5R9 Canada
Phone: 905-668-3570

SUBSTANCE: CHLOROBENZENE

SYMBOL: C₆H₅Cl

TRADE NAMES/SYNONYMS:

PHENYL CHLORIDE; MONOCHLOROBENZENE; CP 27; I.P. CARRIER T 40; MCB; TETROSIR SP; U037; STCC 4909153; UN 1134; MONOCHLOROBENZOL; BENZENE CHLORIDE; B-224; B-255; BBENZENE, CHLORO; MAT04730; RTECS CZ0175000

CHEMICAL FAMILY: halogenated, aromatic

CREATION DATE: Jan 24 1989

REVISION DATE: Mar 16 1999

2. COMPOSITION, INFORMATION ON INGREDIENTS

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COMPONENT: CHLOROBENZENE

CAS NUMBER: 108-90-7

EC NUMBER (EINECS): 203-628-5

EC INDEX NUMBER: 602-033-00-1

PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

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NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=3 REACTIVITY=0

WHMIS CLASSIFICATION: BD2

EC CLASSIFICATION (ASSIGNED):

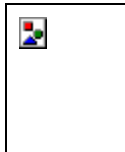
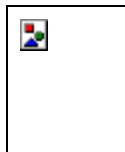
Flammable

Xn Harmful

N Dangerous for the Environment

R 10-20-51/53

EC Classification may be inconsistent with independently-researched data.



EMERGENCY OVERVIEW:

Color: colorless

Physical Form: liquid

Odor: almond odor

Major Health Hazards: harmful if inhaled, respiratory tract irritation, skin irritation, eye irritation, central nervous system depression

Physical Hazards: Flammable liquid and vapor. Vapor may cause flash fire.

POTENTIAL HEALTH EFFECTS:

INHALATION:

Short Term Exposure: irritation, headache, drowsiness, symptoms of drunkenness, bluish skin color, coma

Long Term Exposure: tingling sensation, liver damage

SKIN CONTACT:

Short Term Exposure: irritation, rash

Long Term Exposure: burns

EYE CONTACT:

Short Term Exposure: irritation

Long Term Exposure: same as effects reported in short term exposure

INGESTION:

Short Term Exposure: nausea, vomiting, stomach pain, headache, symptoms of drunkenness, bluish skin color, coma

Long Term Exposure: liver damage

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

4. FIRST AID MEASURES

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INHALATION:

Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT:

Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT:

Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION:

If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN:

For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

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FIRE AND EXPLOSION HAZARDS:

Severe fire hazard. Moderate explosion hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA:

regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING:

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT:

82 F (28 C) (CC)

LOWER FLAMMABLE LIMIT:

1.3%

UPPER FLAMMABLE LIMIT:

7.1%

AUTOIGNITION:

1099 F (593 C)

FLAMMABILITY CLASS (OSHA):

IC

6. ACCIDENTAL RELEASE MEASURES

[Up to Table of Contents](#)

AIR RELEASE:

Reduce vapors with water spray.

SOIL RELEASE:

Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers. Dike for later disposal. Absorb with sand or other non-combustible material. Collect with absorbent into suitable container.

WATER RELEASE:

Absorb with activated carbon. Remove trapped material with suction hoses. Collect spilled material using mechanical equipment.

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Reportable Quantity (RQ): Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

[Up to Table of Contents](#)

Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Store with flammable liquids. Store outside or in a detached building. Keep separated from incompatible substances. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

[Up to Table of Contents](#)

EXPOSURE LIMITS:

CHLOROBENZENE:

75 ppm (350 mg/m³) OSHA TWA

10 ppm (46 mg/m³) ACGIH TWA

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

1000 ppm

Any supplied-air respirator.

Any powered, air-purifying respirator with organic vapor cartridge(s).

Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

Escape -

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

[Up to Table of Contents](#)

PHYSICAL STATE: liquid

COLOR: colorless

ODOR: almond odor

MOLECULAR WEIGHT: 112.56

MOLECULAR FORMULA: C₆H₅Cl

BOILING POINT: 270 F (132 C)

FREEZING POINT: -51 F (-46 C)

VAPOR PRESSURE: 8.8 mmHg @ 20 C

VAPOR DENSITY (air=1): 3.9

SPECIFIC GRAVITY (water=1): 1.107 @ 20/4 C

WATER SOLUBILITY: 0.1%

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: 0.21 ppm

EVAPORATION RATE: 1 (butyl acetate=1)

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Soluble: alcohol, ether, chloroform, benzene, carbon disulfide, carbon tetrachloride

10. STABILITY AND REACTIVITY

[Up to Table of Contents](#)

REACTIVITY:

Stable at normal temperatures and pressure.

CONDITIONS TO AVOID:

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES:

combustible materials, oxidizing materials, metals

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION:

Will not polymerize.

11. TOXICOLOGICAL INFORMATION[Up to Table of Contents](#)

CHLOROBENZENE:**TOXICITY DATA:**

2965 ppm inhalation-rat LC50; 1110 mg/kg oral-rat LD50

CARCINOGEN STATUS:

ACGIH: A3 -Animal Carcinogen

LOCAL EFFECTS:

Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:

Moderately Toxic: inhalation, ingestion

TARGET ORGANS:

central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies

TUMORIGENIC DATA:

Available.

MUTAGENIC DATA:

Available.

REPRODUCTIVE EFFECTS DATA:

Available.

ADDITIONAL DATA:

Alcohol may enhance the toxic effects.

12. ECOLOGICAL INFORMATION[Up to Table of Contents](#)

ECOTOXICITY DATA:**FISH TOXICITY:**

10000 ug/L 96 hour(s) LC50 (Mortality) Sheepshead minnow (*Cyprinodon variegatus*)

INVERTEBRATE TOXICITY:

1720 ug/L 96 hour(s) LC50 (Mortality) Fleshy prawn (*Penaeus chinensis*)

ALGAL TOXICITY:

343000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (*Skeletonema costatum*)

FATE AND TRANSPORT:

BIOCONCENTRATION:

4185 ug/L 48 day(s) BCF (Residue) Green algae (*Oedogonium cardiacum*) 1.01 ug/L

13. DISPOSAL CONSIDERATIONS[Up to Table of Contents](#)

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. Hazardous Waste Number(s): D021. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 100.0 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION[Up to Table of Contents](#)**U.S. DOT 49 CFR 172.101. SHIPPING NAME-UN NUMBER; HAZARD CLASS; PACKING GROUP; LABEL:**

Chlorobenzene-UN1134; 3; III; Flammable liquid



15. REGULATORY INFORMATION[Up to Table of Contents](#)**U.S. REGULATIONS:**

TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Y

Monochlorobenzene

CAS NUMBER: 108-90-7

SECTION 4

CERCLA SECTION 103 (40CFR302.4): Y

Chlorobenzene: 100 LBS RQ

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): Y

Chlorobenzene

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: Y

CHRONIC: N

FIRE: Y

REACTIVE: N

SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:

California Proposition 65: N

EUROPEAN REGULATIONS:

EC NUMBER (EINECS): 203-628-5

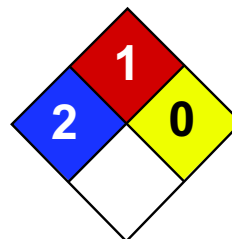
EC RISK AND SAFETY PHRASES:

R 10	Flammable.
R 20	Harmful by inhalation.
R 51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S 2	Keep out of reach of children.
S 24/25	Avoid contact with skin and eyes.
S 61	Avoid release to the environment. Refer to special instructions/Safety data sheets.

16. OTHER INFORMATION[Up to Table of Contents](#)

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:

Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 (mg/m³) from ACGIH (TLV) [United States] TWA: 1 (mg/m³) from OSHA (PEL) [United States] TWA: 0.5 (mg/m³) from NIOSH [United States] TWA: 0.5 (mg/m³) [United Kingdom (UK)] TWA: 0.5 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- 10 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:

Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation, sneezing, redness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconiosis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information**Federal and State Regulations:**

Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 11/06/2008 12:00 PM

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SAFETY DATA SHEET

Based on Directive 2001/58/EC of the Commission of the European Communities

CHRYSENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: none
CAS No. : 218-01-9 BCR number : BCR-269
EC index No. : 601-048-00-0 NFPA code : N.D.
EINECS No. : 205-923-4 Molecular weight : 228.30
RTECS No. : GC0700000 Formula : C18H12

1.2 Use of the substance or the preparation:

Certified reference material for laboratory use only

1.3 Company/undertaking identification:

Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:

+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
chrysene	218-01-9 205-923-4	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:

- Consult a doctor/medical service if irritation persists
- Rinse immediately with water

4.2 Skin contact:

- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Wipe off dry product from skin
- Remove clothing before washing

4.3 After inhalation:

- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:

- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person

Printing date : 07-2002
Compiled by : Brandweerinformatiecentrum voor Gevaarlijke Stoffen vzw (BIG)
Technische Schoolstraat 43 A, B-2440 Geel
☎ +32 14 58 45 47 <http://www.big.be> E-mail: info@big.be

1 / 8

MSDS established :
Reference number : BIG\18207GB
Reason for revision : Directive 2001/58/EC
Revision date : 22-03-2002
Revision number : 001

CHRYSENE

- Do not induce vomiting

CHRYSENE

5. Fire-fighting measures

5.1 Suitable extinguishing media:

- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:

- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:

- Not easily combustible
- Upon combustion CO and CO₂ are formed

5.4 Instructions:

- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:

- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see heading 8.1/8.3/10.3

6.2 Environmental precautions:

- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:

- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Spill must not return in its original container
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:

- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

7.2 Storage:

- Keep container tightly closed. Store only in a limited quantity. Store in a dry area. Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature	: N.D.	°C
Quantity limits	: N.D.	kg
Storage life	: N.D.	
Materials for packaging	:	
- suitable	:no data available	
- to avoid	:no data available	

7.3 Specific uses:

- See information supplied by the manufacturer

CHRYSENE

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA : not listed
TLV-STEL : not listed
TLV-Ceiling : not listed

OES-LTEL : not listed
OES-STEL : not listed
MEL-LTEL : not listed
MEL-STEL : not listed

MAK : not listed
TRK : not listed

MAC-TGG 8 h : not listed
MAC-TGG 15 min. : not listed
MAC-Ceiling : not listed

VME-8 h : not listed
VLE-15 min. : not listed

GWBB-8 h : not listed
GWK-15 min. : not listed
Momentary value : not listed

EC : not listed
EC-STEL : not listed

Sampling methods:

- Chrysene (Polynuclear aromatic Hydrocarbons)	NIOSH 5515
- Chrysene	OSHA 58
- Chrysene (Polynuclear aromatic Hydrocarbons)	NIOSH 5506

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see heading 13

8.3 Personal protection:

8.3.1 respiratory protection:

- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:

- Gloves
Suitable materials: No data available
- Breakthrough time: N.D.

8.3.3 eye protection:

- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:

- Protective clothing
- In case of dust production: head/neck protection
Suitable materials: No data available

CHRYSENE

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	: Crystalline solid / Flakes
Odour	: Odourless
Colour	: White

9.2 Important health, safety and environmental information:

pH value	: N.D.	
Boiling point/boiling range	: 448	°C
Flashpoint	: N.D.	°C
Explosion limits	: N.D.	vol% (°C)
Vapour pressure (at 20°C)	: N.D.	hPa
Vapour pressure (at 50°C)	: N.D.	hPa
Relative density (at 20°C)	: 1.27	
Water solubility	: < 0.001	g/100 ml
Soluble in	: N.D.	
Relative vapour density	: N.D.	
Viscosity	: N.D.	Pa.s
Partition coefficient n-octanol/water	: 5.61/5.73	
Evaporation rate		
ratio to butyl acetate	: N.D.	
ratio to ether	: N.D.	

9.3 Other information:

Melting point/melting range	: 256	°C
Auto-ignition point	: N.D.	°C
Saturation concentration	: N.D.	g/m ³

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:

- Stable under normal conditions

10.2 Materials to avoid:

- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:

- Upon combustion CO and CO₂ are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	: N.D.	mg/kg
LD50 dermal rat	: N.D.	mg/kg
LD50 dermal rabbit	: N.D.	mg/kg
LC50 inhalation rat	: N.D.	mg/l/4 h
LC50 inhalation rat	: N.D.	ppm/4 h

11.2 Chronic toxicity:

EC carc. cat. : 2
 EC muta. cat. : 3
 EC repr. cat. : not listed

 Carcinogenicity (TLV) : A3
 Carcinogenicity (MAC) : K
 Carcinogenicity (VME) : not listed
 Carcinogenicity (GWBB) : not listed

 Carcinogenicity (MAK) : 2
 Mutagenicity (MAK) : not listed
 Teratogenicity (MAK) : -

 IARC classification : 3

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
 Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER SKIN CONTACT
 - Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- No certainty about human mutagenic properties
- ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available
- SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Photoallergy
- Cracking of the skin
- Skin rash/inflammation
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- LC50 (24 h) : 0.0007 mg/l (DAPHNIA MAGNA)
- LC50 (24 h) : >6.7 mg/l (RANA SP.)

12.2 Mobility:

- Volatile organic compounds (VOC): N.D. %
- Forming sediments in water
- Adsorbs into the soil
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- biodegradation BOD₅ : N.D. % ThOD
- water : - Not readily biodegradable in water
- soil : T $\frac{1}{2}$: > 77 days

12.4 Bioaccumulative potential:

- log P_{ow} : 5.61/5.73
- BCF : 4440 (LAMELLIBRANCHIATA)
- Highly bioaccumulative

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council)

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

14. Transport information

90
3077

- 14.1 Classification of the substance in compliance with UN Recommendations
- | | |
|----------------------|--|
| UN number | : 3077 |
| CLASS | : 9 |
| SUB RISKS | : - |
| PACKING | : III |
| PROPER SHIPPING NAME | : UN 3077, Environmentally hazardous substance, solid, n.o.s. (chrysene) |
- 14.2 ADR (transport by road)
- | | |
|-----------------------|-------|
| CLASS | : 9 |
| PACKING | : III |
| DANGER LABEL TANKS | : 9 |
| DANGER LABEL PACKAGES | : 9 |
- 14.3 RID (transport by rail)
- | | |
|-----------------------|-------|
| CLASS | : 9 |
| PACKING | : III |
| DANGER LABEL TANKS | : 9 |
| DANGER LABEL PACKAGES | : 9 |
- 14.4 ADNR (transport by inland waterways)
- | | |
|-----------------------|-------|
| CLASS | : 9 |
| PACKING | : III |
| DANGER LABEL TANKS | : 9 |
| DANGER LABEL PACKAGES | : 9 |
- 14.5 IMDG (maritime transport)
- | | |
|------------------|-------|
| CLASS | : 9 |
| SUB RISKS | : - |
| PACKING | : III |
| MFAG | : - |
| EMS | : - |
| MARINE POLLUTANT | : P |
- 14.6 ICAO (air transport)
- | | |
|---|-------|
| CLASS | : 9 |
| SUB RISKS | : - |
| PACKING | : III |
| PACKING INSTRUCTIONS PASSENGER AIRCRAFT | : |
| PACKING INSTRUCTIONS CARGO AIRCRAFT | : |
- 14.7 Special precautions in connection with transport : none
- 14.8 Limited quantities (LQ) :
- When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
- each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
- or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

CHRYSENE

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Toxic



Dangerous for the environment

- R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
- S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
* = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

- R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:

TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:

K : List of the carcinogenic substances and processes - The Netherlands 2002

SDS ID No.: 9942

Safety Data Sheet (SDS)

Coal Tar

Section 1 – Identification

1(a) Product Identifier used on Label: Coal Tar

1(b) Other means of identification: Crude Coal Tar, 9942

1(c) Recommended use of the chemical and restrictions on use: There are no known restrictions on use.

1(d) Name, address, and telephone number:

ArcelorMittal Dofasco, Inc.

Phone number: 1-905-548-7200 Ext. 4051 (By-Product Sales)

P.O Box 2460




Hamilton, Ontario, Canada L8N 3J5

1(e) Emergency phone number: 1-760-476-3962 (3E Company Code: 333211)

Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Coal Tar is considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in “GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3” United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal word, hazard statement(s), symbols and precautionary statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Acute Toxicity, Inhalation - 3	Danger	Toxic if inhaled. May cause genetic defects. May cause cancer. May damage fertility or the unborn child. May cause central nervous system depression, respiratory irritation drowsiness or dizziness and damage to lungs, liver and blood cells. Causes skin irritation. Causes serious eye irritation. May cause allergic skin reaction.
	Germ Cell Mutagenicity - 2 Carcinogenicity - 1A Reproductive Toxicity - 1A Single Target Organ Toxicity (STOT) Single Exposure - 2		
	Skin Irritation - 2 Eye Irritation - 2A Sensitization - Skin - 1A		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Do not breathe dusts / gas / mist / vapor / spray. Use only outdoors or in well ventilated areas. Wear protective gloves / protective clothing / eye protection / face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothes must not be allowed out of the workplace.	If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice/attention. If on skin: Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention. If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting. If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor.	Store in well ventilated place. Store locked up. Dispose of contents in accordance with Federal, Provincial/State and local regulations.

2(c) Hazards not otherwise classified: None Known

2(d) Unknown acute toxicity statement (mixture): None Known

COAL TAR



ArcelorMittal

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Section 3 – Composition/Information on Ingredients

3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration:

Chemical Name	CAS Number	EC Number	% weight
Coal Tar, High Temp*	65996-89-6	266-024-0	100
This product is a complex mixture of organic hydrocarbons. Listed below is a partial listing of the components that comprise this product:			
Naphthalene	91-20-3	202-049-5	3-12
PNA (Polycyclic Aromatic Hydrocarbon, also known as Polynuclear Aromatics) Compounds	Various	Various	11-30
Benzene	71-43-2	200-753-7	< 1
Toluene	108-88-3	203-625-9	< 1

EC - European Community CAS - Chemical Abstract Service

* Tar, Coal, High Temperature is comprised of various chemicals such as but not limited to: Cresols, Phenols, Cumenes, Poly-Nuclear Aromatics (PNAs) and other Benzene Soluble chemicals.

Section 4 – First-aid Measures

4(a) Description of necessary measures: If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor.

- **Inhalation:** If inhaled: Remove person to fresh air and keep comfortable for breathing.
- **Eye Contact:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice/attention.
- **Skin Contact:** Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
- **Ingestion:** Immediately call a poison center or doctor. Do NOT induce vomiting.

4(b) Most important symptoms/effects, acute and delayed (chronic):

Acute Effects:

- **Inhalation:** Acute respiratory effects caused by overexposure to coal tar may include coughing, sneezing, and swollen or irritated nasal mucosa and sinuses.
- **Eye:** Vapors or mist may cause irritation to the eyes and mucous membranes.
- **Skin:** Exposure to Coal Tar can cause skin irritation characterized by skin itching, burning, swelling and redness. Short-term exposures may also cause transient photosensitization.
- **Ingestion:** Unlikely route of exposure. If ingested, may cause headache, drunkenness, nausea, vomiting, weakness, convulsions, unconsciousness and coma. Aspiration of this material into the lungs can cause chemical pneumonia.

Delayed (chronic) Effects:

- May cause genetic defects and damage fertility or the unborn child. Harmful if inhaled or absorbed through the skin. May cause eye and skin irritation. Repeated excessive exposures may cause blood disorders such as anemia and leukemia. Repeated excessive exposures may cause liver and/or kidney effects or damage. Material has been related to cancer in humans.

4(c) Immediate Medical Attention and Special Treatment: If quantity ingested is 1.0 ml/kg or greater, careful gastric lavage may be indicated, being careful to avoid aspiration.

Section 5 – Fire-fighting Measures

5(a) Suitable (and unsuitable) Extinguishing Media: Small Fires - Foam, CO2, Dry Chemical, Water Spray. Large Fires - Water spray, fog or foam. Frothing may occur if material is molten.

5(b) Specific Hazards arising from the chemical: When burned, toxic smoke and vapor may be emitted including, oxides of carbon and sulfur, PNA's, aromatic hydrocarbons and other toxic vapors..

5(c) Special protective equipment and precautions for fire-fighters: Self-contained MSHA/NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used. Evacuate area. Remove pressurized gas cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: For spills, clean-up personnel should be protected against contact with eyes and skin. Large spills should be diked and foam applied. Do not release into sewers or waterways. Use absorbent material such as vermiculite or sand to soak up spill. Contain material and follow normal clean-up procedures. Collect material in appropriate, labeled containers for recovery or disposal in accordance with Federal, Provincial/State, and Local regulations. Keep unnecessary people away. Isolate hazard area and deny entry. Stay upwind.

Section 6 - Accidental Release Measures (continued)

6(b) Methods and materials for containment and clean up: Collect material in appropriate, labeled containers for recovery or disposal in accordance with Federal, Provincial/State, and Local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent Provincial/State and Federal requirements.

Section 7 - Handling and Storage

7(a) Precautions for safe handling: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use only outdoors or in well ventilated areas. Do not breathe gas / mist / vapor / spray. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothes must not be allowed out of the workplace. Avoid direct contact on skin, eyes or on clothing. Handle and use in accordance with OSHA29CFR1910.106 or local codes. Observe proper industrial hygiene practices. Comply with the OSHA Benzene Standard, 29CFR1910.1028, and all other applicable regulatory standards. Emergency safety showers and eye wash stations should be present.

7(b) Conditions for safe storage, including any incompatibilities: Store locked up. Use only outdoors or in a well ventilated area. Store in a well-ventilated place. Control all ignition sources (including smoking).

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	MOL ⁴
Coal Tar	0.2 mg/m ³ (benzene soluble fraction)	0.2 mg/m (as benzene soluble aerosol for coal tar pitch volatiles)	0.1 mg/m ³ (cyclohexane-extractable fraction)	0.2 mg/m (as benzene soluble aerosol for coal tar pitch volatiles)
Naphthalene	10 ppm (50 mg/m ³)	10 ppm (52 mg/m ³), skin "STEL" 15 ppm (79 mg/m ³)	10 ppm (50 mg/m ³) "STEL" 15 ppm (75 mg/m ³)	10 ppm, skin "STEL" 15 ppm
Benzene	1.0 ppm "STEL" 5.0 ppm	0.5 ppm (1.6 mg/m ³), skin "STEL" 2.5 ppm (188 mg/m ³)	0.1 ppm (0.32 mg/m ³) "STEL" 1.0 ppm (3.2 mg/m ³)	0.5 ppm, skin "STEL" 2.5 ppm
Toluene	200 ppm "C" 300 ppm	20 ppm	100 ppm (375 mg/m ³) "STEL" 150 ppm (560 mg/m ³)	20ppm

NE - None Established

1. OSHA Permissible Exposure Limits (PELs) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A (C) designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Peak is defined as the acceptable maximum peak for a maximum duration above the ceiling concentration for an eight-hour shift. A skin notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures. A "skin" notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. ACGIH-TLVs are only recommended guidelines based upon consensus agreement of the membership of the ACGIH. As such, the ACGIH TLVs are for guideline use purposes and are not legal regulatory standards for compliance purposes. The TLVs are designed for use by individuals trained in the discipline of industrial hygiene relative to the evaluation of exposure to various chemical or biological substances and physical agents that may be found in the workplace.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL) - Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. Ontario Ministry of Labour. Employers are required under section 4 of Regulation 833, Control of Exposure to Biological or Chemical Agents (the "Regulation"), to limit the exposure of workers to specified hazardous biological or chemical agents in accordance with the values set out in the "Ontario Table" (which is Table 1 in the Regulation) or, if the agent is not listed in the Ontario Table, the ACGIH Table that is incorporated by reference in the Regulation.

8(b) Appropriate Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes, dusts and heat during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits.

Section 8 - Exposure Controls / Personal Protection (continued)

8(c) Individual Protection Measures:

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-mask negative-pressure, air-purifying respirator equipped with organic vapor cartridge is acceptable for concentrations up to 10 times the exposure limit. Full-face negative-pressure air purifying respirator equipped with organic vapor cartridges is acceptable for concentrations up to 50 times the exposure limit. Protection by air purifying both negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self-contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

- **Eyes:** Employees should be required to wear chemical safety glasses to prevent eye contact. A face shield should be used when appropriate to prevent contact with splashed materials. Chemical goggles, face shields or glasses should be worn to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material is likely.
- **Skin:** Persons handling this product should wear appropriate clothing to prevent skin contact. Wear protective gloves. Contaminated work clothes must not be allowed out of the workplace. Wash skin that has been exposed with soap and water.
- **Other protective equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

9(a) Appearance (physical state, color, etc.): Black viscous liquid

9(b) Odor: Aromatic.

9(c) Odor Threshold: NA

9(d) pH: NA

9(e) Melting Point/Freezing Point: NA

9(f) Initial Boiling Point and Boiling Range: NA

9(g) Flash Point: 102°C. (215.6°F.) Flash point may be lowered depending on vapour space.

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Under open spill conditions tar is not normally combustible. In confined areas such as storage tanks, tanker trucks, or process vessels with a vapour space the vapour space will in many cases be close to or above the LEL.

9(j) Upper/lower Flammability or Explosive Limits: ND

9(k) Vapor Pressure: <0.1 KPA @ 20OC

9(l) Vapor Density (Air = 1): >1

9(m) Relative Density: 1.2 (Water = 1)

9(n) Solubility(ies): Partially soluble in methanol, soluble in benzene.

9(o) Partition Coefficient n-octanol/water: ND

9(p) Auto-ignition Temperature: NA

9(q) Decomposition Temperature: ND

9(r) Viscosity: NA

NA - Not Applicable

ND - Not Determined for product as a whole

Section 10 - Stability and Reactivity

10(a) Reactivity: Reacts violently with strong oxidizers such as liquid chlorine, sodium or potassium hypochlorite, nitric acid and peroxides.

10(b) Chemical Stability: Coal tar is stable under normal storage and handling conditions.

10(c) Possibility of hazardous reaction: None Known

10(d) Conditions to Avoid: Storage with incompatible materials. Avoid heat, flame or ignition sources.

10(e) Incompatible Materials: Oxidizing agents.

10(f) Hazardous Decomposition Products: Carbon compounds. Carbon oxides (CO, CO₂), Coal tar pitch.

COAL TAR



ArcelorMittal

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Section 11 - Toxicological Information

11 Information on Toxicological Effects: The following toxicity data has been determined for **Coal Tar** by using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL. Individual hazard classification categories where the available toxicological data has met or exceeded a classification threshold are provided in the table below:

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Acute Toxicity Hazard (covers Categories 1-4)	NR	3 ^a		Danger	Toxic if inhaled.
Skin Irritation (covers Categories 1A, 1B, and 2)	NR	2 ^b		Warning	Causes skin irritation.
Eye Damage/Irritation (covers Categories 1, 2A and 2B)	NR	2A ^c		Warning	Causes serious eye irritation.
Skin/Dermal Sensitization (covers Category 1A and 1B)	1	1A ^d		Warning	May cause an allergic skin reaction.
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	1B	2 ^f		Danger	May cause genetic defects.
Carcinogenicity (covers Categories 1A, 1B and 2)	1	1A ^g		Danger	May cause cancer.
Reproductive Toxicity (covers Categories 1A, 1B and 2)	1B	1A ^h		Danger	May damage fertility or the unborn child.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	NR	2 ⁱ		Warning	May cause central nervous system depression, respiratory irritation drowsiness or dizziness and damage to lungs, liver and blood cells.

NR - Not Rated - Available data does not meet criteria for classification.

Below is additional toxicological data regarding this product:

- No LC₅₀ or LD₅₀ has been established for **Coal Tar**. The following data has been determined for the components:
 - Coal Tar:** Rat LD₅₀ > 2000 mg/kg (REACH)
Mouse LD₅₀ > 1600 mg/kg (IUCLID)
- No Skin (Dermal) Irritation data available for **Coal Tar** as a mixture or its components.
- No Eye Irritation data available for **Coal Tar** as a mixture or its components.
- No Skin (Dermal) Sensitization data available for **Coal Tar** as a mixture or its components.
- No Respiratory Sensitization data available for **Coal Tar** as a mixture or its components.
- No Germ Cell Mutagenicity data available for **Coal Tar** as a mixture. The following Mutagenicity and Genotoxicity information was found for the components:
 - Coal Tar** - Positive ames test, bacterial mutation
- Carcinogenicity: IARC, NTP, and OSHA do not list **Coal Tar** as carcinogens. The following Carcinogenicity information was found for the components:
 - Coal Tar - NTP has concluded that there is sufficient evidence that Coal Tars are carcinogenic in humans and experimental animals. Exposure to Coal Tars causes skin, lung, bladder and gastrointestinal cancers. This effect may be due to the presence of polycyclic aromatic hydrocarbons. OSHA (29 CFR 1910.1002) regulates coal tar pitch volatiles and ACGIH (2014 TLV Booklet) classifies coal tar as confirmed human carcinogens. IARC lists coal tar as a Group 1 carcinogen.
- No Toxic Reproduction data available for **Coal Tar** as a mixture. The following Toxic Reproduction information was found for the components:
 - Coal Tar:** Reproductive toxin based on REACH classification.
- No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Coal Tar** as a mixture or its components.
- No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Coal Tar** as a whole or its components.

Section 11 - Toxicological Information (continued)

11 Information on toxicological effects: (continued)

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS), European Union Classification, Labeling and Packaging (EU CPL), Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), International Uniform Chemical Information Database (IUCLID), TOXicology Data NETwork (TOXNET), European Risk Assessment Reports (EU RAR).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

Acute Effects by Component:

- **Coal Tar:** Acute respiratory effects may include coughing, sneezing, and swollen or irritated nasal mucosa and sinuses. Vapors or mist may cause irritation to the eyes and mucous membranes. Can cause skin irritation characterized by skin itching, burning, swelling and redness. Gastrointestinal disturbances (i.e., nausea and vomiting) and systemic toxicity may occur if absorbed. Ingestion of this material may cause irritation to the mouth, throat and gastrointestinal tract.

Delayed (chronic) Effects by component:

- **Coal Tar:** May cause genetic defects and damage fertility or the unborn child. Harmful if inhaled or absorbed through the skin. May cause eye and skin irritation. Repeated excessive exposures may cause blood disorders such as anemia and leukemia. Repeated excessive exposures may cause liver and/or kidney effects or damage. Material has been related to cancer in humans.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial):

- **Coal Tar:** LC₅₀ Brachydanio rerio > 250 mg/L, LC₅₀ Oryzias letipes > 12.1 mg/L, LC₅₀ Pagrus major > 39.2 mg/L, LC₅₀ Oncorhynchus mykiss > 100 mg/L

12(b) Persistence & Degradability: No Data Available for **Coal Tar** or individual components.

12(c) Bioaccumulative Potential: No Data Available for **Coal Tar** or individual components.

12(d) Mobility (in soil): No data available for **Coal Tar** as a whole. However, benzene and toluene are have been estimated to be moderately to highly mobile in soil. Evaporation is expected to be the primary loss mechanism from water. Benzene and toluene are not expected to adsorb to sediment and suspended solids in water. Volatilization half-lives for a model river and model lake have been estimated to be 1 hr and 3.5 days, respectively for benzene and 1 hour and 4 days, respectively for toluene.

12(e) Other adverse effects: No Data Available

Additional Information:

Hazard Category: Acute 2, Chronic 2

Signal Word: No Signal Word

Hazard Symbol:



Hazard Statement: Toxic to aquatic life with long lasting effects.

Section 13 - Disposal Considerations

Disposal: Dispose of in accordance with Local, Provincial/State, Federal and International regulations. Observe safe handling precautions.

Container Cleaning and Disposal: Follow Local, Provincial/State, Federal and international regulations. Observe safe handling precautions

Section 14 - Transport Information

US Department of Transportation (DOT) under 49 CFR 172.101 regulates **Coal Tar** as a (as **Environmentally Hazardous Substance, liquid, n.o.s.**). All Local, Provincial/State, Federal and international regulations that apply to the transport of this type of material must be adhered to.

Shipping Name: RQ, NA3082, Other regulated substances, liquid, n.o.s., 9, PG III (contains naphthalene)

Shipping Symbols: G

Hazard Class: 9

UN No UN3082

Packing Group: PG III

DOT/ IMO Label: 9

Special Provisions (172.102): 8, 146, IB3, T4, TP1, TP29

Packaging Authorizations:

- a) **Exceptions:** 155
- b) **Non-bulk:** 203
- c) **Bulk:** 241

Quantity Limitations:

- a) **Passenger, Aircraft, or Railcar:** No Limit

- b) **Cargo Aircraft Only:** No Limit

Vessel Stowage Requirements:

- a) **Vessel Stowage:** A
- b) **Other:** Not Applicable

DOT Reportable Quantities: Not Applicable

COAL TAR



ArcelorMittal

SDS ID No.: 9942

Revision: 05/27/2015

Section 14 - Transport Information (continued)

International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) regulates **Crude Coal Tar** as a **(Environmentally Hazardous Substance, liquid, n.o.s.)** as a hazardous material.

Shipping Name: Environmentally Hazardous Substance, liquid, n.o.s. (contains naphthalene) Classification Code: 9 UN No.: UN3082 Packing Group: PG III ADR Label: 9 Special Provisions: 274, 335, 909 Limited Quantities: 5L	Packaging: a) Packing Instructions: P001, LP01 b) Special Packing Provisions: PP1 c) Mixed Packing Provisions: Not Applicable	Portable Tanks & Bulk Containers: a) Instructions: T4 b) Special Provisions: TP2, TP29
--	--	---

IATA – International Air Transport Association (IATA) does regulate **Coal Tar (as Environmentally Hazardous Substance, liquid, n.o.s.)** as a hazardous material.

Shipping Name: Environmentally Hazardous Substance, n.o.s. (contains naphthalene) Class/Division: 9 Hazard Label (s): Miscellaneous UN No.: UN3082 Packing Group: PG III Excepted Quantities (EQ): E1	Passenger & Cargo Aircraft Limited Quantity (EQ) Pkg Inst: Y914 Max Net Qty/Pkg: 30 kg G	Cargo Aircraft Only Pkg Inst: 914 Max Net Qty/Pkg: 450L	Special Provisions: A97 A158 ERG Code: Not Applicable
--	---	--	--

Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) Classification: Coal Tar

Shipping Name: Environmentally Hazardous Substance, liquid, n.o.s. (contains naphthalene)

UN No UN3082

Shipping Symbols: G

Packing Group: PG III

Hazard Class: 9

Label: 9

Section 15 - Regulatory Information

Regulatory Information: The following listing of regulations relating to an ArcelorMittal Dofasco Inc. product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

This product and/or its constituents are subject to the following regulations:

OSHA Regulations: Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, **Coal Tar** as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection.

EPA Regulations: The product, **Coal Tar** is not listed as a whole. However, individual components of the product are listed:

Components	Regulations
Naphthalene	SARA 313, CERCLA, RCRA, CWA
Benzene	SARA 313, CERCLA, RCRA, SDWA, CWA, CAA
Toluene	SARA 313, CERCLA, RCRA, SDWA, CWA

SARA 311/312 Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard.

Regulations Key:

CAA	Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (42 USC Secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, Table 302.4 and App. A)
CWA	Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
RCRA	Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III Section 302 Extremely Hazardous Substances (42 USC Secs. 11023, 13106; 40 CFR sec. 372.65) and Section 313 Toxic Chemicals (42 USC Secs. 11023, 13106; 40 CFR Sec. 372.65 [as of 6/30/05])
TSCA	Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
SDWA	Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

COAL TAR



ArcelorMittal

SDS ID No.: 9942

Revision: 05/27/2015

Section 15 - Regulatory Information

Section 313 Supplier Notification: The product, **Coal Tar** contains toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act and 40 CFR part 372. This includes benzene, toluene, naphthalene and Polycyclic Aromatic Compounds.

State Regulations: The product, **Coal Tar** as a whole is listed in state regulations.

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substance: Tar, Coal.
- Environmental Hazards: Tar, Coal.
- Special Hazardous Substance: Tar, Coal.

California Prop. 65: Does not contain elements known to the State of California to cause cancer or reproductive toxicity.

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Coal Tar.
- Special Hazardous Substance: Coal Tar.

Minnesota: Coal Tar.

Massachusetts: Coal Tar.

Section 16 - Other Information

Prepared By: ArcelorMittal Dofasco Inc.

Original Issue Date: 10/25/1988

Update to SDS format: 05/27/2015

Additional Information:

Hazardous Material Identification System (HMIS) Classification

Health Hazard	2
Fire Hazard	1
Physical Hazard	1

HEALTH= 2, * Denotes Temporary or minor injury may occur.

FIRE= 1, Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200°F. (Class IIIB).

PHYSICAL HAZARDS= 1, Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

National Fire Protection Association (NFPA)



HEALTH = 2- Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

FIRE = 1 - Must be preheated before ignition can occur.

INSTABILITY = 1- Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	NIF	No Information Found
BEIs	Biological Exposure Indices	NIOSH	National Institute for Occupational Safety and Health
CAS	Chemical Abstracts Service	NTP	National Toxicology Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	ORC	Organization Resources Counselors
CLP	Classification, Labelling and Packaging.	OSHA	Occupational Safety and Health Administration
CFR	Code of Federal Regulations	PEL	Permissible Exposure Limit
CNS	Central Nervous System	PNOR	Particulate Not Otherwise Regulated
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract	PNOC	Particulate Not Otherwise Classified
HMIS	Hazardous Materials Identification System	PPE	Personal Protective Equipment
IARC	International Agency for Research on Cancer	ppm	parts per million
LC50	Median Lethal Concentration	RCRA	Resource Conservation and Recovery Act
LD50	Median Lethal Dose	REACH	Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals.
LD_{Lo}	Lowest Dose to have killed animals or humans	RTECS	Registry of Toxic Effects of Chemical Substances
LEL	Lower Explosive Limit	SARA	Superfund Amendment and Reauthorization Act
LOEL	Lowest Observed Effect Level	SCBA	Self-contained Breathing Apparatus
LOAEC	Lowest Observable Adverse Effect Concentration	SDS	Safety Data Sheet
µg/m³	microgram per cubic meter of air	STEL	Short-term Exposure Limit
mg/m³	milligram per cubic meter of air	TLV	Threshold Limit Value
mppcf	million particles per cubic foot	TWA	Time-weighted Average
MSHA	Mine Safety and Health Administration	UEL	Upper Explosive Limit
NFPA	National Fire Protection Association		

**Section 16 - Other Information (continued)**

Disclaimer: The information contained in this Safety Data Sheet is taken from sources and/or based upon data believed to be reliable as of the date of issue. Neither the above-named supplier nor any of its subsidiaries assumes any liability whatsoever in connection with the information contained herein. NO WARRANTIES ARE MADE, WHETHER EXPRESS OR IMPLIED, INCLUDING WITH RESPECT TO THE COMPLETENESS, ACCURACY OR SUFFICIENCY OF THE FOREGOING, OR ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE. The user is responsible for determining whether the product is fit for a particular purpose and suitable for user's method of use or application.

Coal Tar

Signal Word: DANGER

Symbols:



HAZARD STATEMENTS:

Toxic if inhaled.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause central nervous system depression, respiratory irritation drowsiness or dizziness and damage to lungs, liver and blood cells.
Causes skin irritation.
Causes serious eye irritation.
May cause allergic skin reaction.

PRECAUTIONARY STATEMENTS:

Do not breathe dusts / fume / gas / mist / vapor / spray.
Use only outdoors or in well ventilated areas.
Wear protective gloves / protective clothing / eye protection / face protection.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Contaminated work clothes must not be allowed out of the workplace.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice/attention.
If on skin: Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.
If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor.
Store in well ventilated place.
Store locked up.
Dispose of contents in accordance with Federal, Provincial/State and Local regulations.

SDS ID No.: 9942

ArcelorMittal Dofasco, Inc.

P.O Box 2460

Hamilton, Ontario, Canada L8N 3J5

General Information: Phone: 1-905-548-7200 Ext. 4051 (By-Product Sales)

Emergency Contact: 1-760-476-3962, (3E Company Code: 333211)

Original Issue Date: 10/25/1988

Revised: 05/27/2015

ERROR: undefined
OFFENDING COMMAND: get

STACK:

/quit
-dictionary-
-mark-

Cyanide (cas 57-12-5) MSDS

MSDS : Cyanide

CAS : 57-12-5

SYNONYMS : * Carbon nitride ion (CN(sup 1-))

* Cyanide(1-)

* Cyanide, dry (UN1588)

* Cyanide anion

* Cyanide (CN(sup 1-))

* Cyanide ion

* Cyanide(1-) ion

* Cyanure

* Isocyanide

* RCRA waste number P030

Catalog of Chemical Suppliers, Buyers, Custom Synthesis Companies And Equipment Manufacturers
[Cyanide 57-12-5]

*** CHEMICAL IDENTIFICATION ***

RTECS NUMBER : GS7175000

CHEMICAL NAME : Cyanide

CAS REGISTRY NUMBER : 57-12-5

BEILSTEIN REFERENCE NO. : 1900509

LAST UPDATED : 199710

DATA ITEMS CITED : 31

MOLECULAR FORMULA : C-N

MOLECULAR WEIGHT : 26.02

WISWESSER LINE NOTATION : H CN

SYNONYMS/TRADE NAMES :

- * Carbon nitride ion (CN(sup 1-))
- * Cyanide(1-)
- * Cyanide, dry (UN1588)
- * Cyanide anion
- * Cyanide (CN(sup 1-))
- * Cyanide ion
- * Cyanide(1-) ion
- * Cyanure

* Isocyanide
* RCRA waste number P030

*** HEALTH HAZARD DATA ***

** ACUTE TOXICITY DATA **

TYPE OF TEST : LD50 - Lethal dose, 50 percent kill
ROUTE OF EXPOSURE : Intraperitoneal
SPECIES OBSERVED : Rodent - mouse
DOSE/DURATION : 3 mg/kg
TOXIC EFFECTS :

Behavioral - tremor
Behavioral - convulsions or effect on seizure threshold
Lungs, Thorax, or Respiration - dyspnea

REFERENCE :

NATUAS Nature. (Nature Subscription Dept., POB 1018, Manasquan, NJ 08736)
V.1- 1869- Volume(issue)/page/year: 228,1315,1970

*** REVIEWS ***

TOXICOLOGY REVIEW

CLCHAU Clinical Chemistry (Winston-Salem, NC). (American Assoc. for
Clinical Chemistry, 1725 K St., NW, Washington, DC 20006) V.1- 1955-
Volume(issue)/page/year: 19,361,1973

*** U.S. STANDARDS AND REGULATIONS ***

MSHA STANDARD-air:TWA 5 mg/m3 (skin)
DTLVS* The Threshold Limit Values (TLVs) and Biological Exposure Indices
(BEIs) booklet issues by American Conference of Governmental Industrial
Hygienists (ACGIH), Cincinnati, OH, 1996 Volume(issue)/page/year: 3,64,1971

OSHA PEL (Gen Indu):8H TWA 5 mg (CN) /m3
CFRGR Code of Federal Regulations. (U.S. Government Printing Office, Supt.
of Documents, Washington, DC 20402) Volume(issue)/page/year:
29,1910.1000,1994

OSHA PEL (Construc):8H TWA 5 mg (CN) /m3
CFRGR Code of Federal Regulations. (U.S. Government Printing Office, Supt.
of Documents, Washington, DC 20402) Volume(issue)/page/year:
29,1926.55,1994

OSHA PEL (Shipyard):8H TWA 5 mg(CN)/m3

CFRGBR Code of Federal Regulations. (U.S. Government Printing Office, Supt.
of Documents, Washington, DC 20402) Volume(issue)/page/year:
29,1915.1000,1993

OSHA PEL (Fed Cont):8H TWA 5 mg(CN)/m3

CFRGBR Code of Federal Regulations. (U.S. Government Printing Office, Supt.
of Documents, Washington, DC 20402) Volume(issue)/page/year:
41,50-204.50,1994

*** OCCUPATIONAL EXPOSURE LIMITS ***

OEL-ARAB Republic of Egypt:TWA 5 mg/m3;Skin JAN 1993

OEL-AUSTRALIA:TWA 5 mg/m3;Skin JAN 1993

OEL-AUSTRIA:TWA 5 mg/m3;Skin JAN 1993

OEL-DENMARK:TWA 5 mg/m3;Skin JAN 1993

OEL-FINLAND:TWA 5 mg/m3;STEL 10 mg/m3 JAN 1993

OEL-FRANCE:TWA 5 mg/m3;Skin JAN 1993

OEL-GERMANY:TWA 5 mg/m3;Skin JAN 1993

OEL-HUNGARY:TWA 0.3 mg/m3;STEL 0.6 mg/m3;Skin JAN 1993

OEL-INDIA:TWA 4 mg/m3;Skin JAN 1993

OEL-THE NETHERLANDS:TWA 5 mg/m3;Skin JAN 1993

OEL-THE PHILIPPINES:TWA 5 mg/m3;Skin JAN 1993

OEL-POLAND:TWA 0.3 mg/m3 JAN 1993

OEL-SWEDEN:STEL 5 mg/m3;Skin JAN 1993

OEL-SWITZERLAND:TWA 5 mg/m3;STEL 10 mg/m3;Skin JAN 1993

OEL-THAILAND:TWA 5 mg/m3 JAN 1993

OEL-UNITED KINGDOM:TWA 5 mg/m3;Skin JAN 1993

*** NIOSH STANDARDS DEVELOPMENT AND SURVEILLANCE DATA ***

NIOSH RECOMMENDED EXPOSURE LEVEL (REL) :

NIOSH REL TO CYANIDE-air:CL 4.7 ppm(CN)/10M

REFERENCE :

NIOSH* National Institute for Occupational Safety and Health, U.S. Dept. of Health, Education, and Welfare, Reports and Memoranda.

Volume(issue)/page/year: DHHS #92-100,1992

NIOSH OCCUPATIONAL EXPOSURE SURVEY DATA :

NOES - National Occupational Exposure Survey (1983)

NOES Hazard Code - X3010

No. of Facilities: 8 (estimated)

No. of Industries: 1

No. of Occupations: 1

No. of Employees: 367 (estimated)

No. of Female Employees: 120 (estimated)

*** STATUS IN U.S. ***

ATSDR TOXICOLOGY PROFILE

NTIS** National Technical Information Service. (Springfield, VA 22161)

Formerly U.S. Clearinghouse for Scientific & Technical Information.

Volume(issue)/page/year: PB/90/162058/AS

EPA TSCA Section 8(b) CHEMICAL INVENTORY

EPA TSCA Section 8(d) unpublished health/safety studies

On EPA IRIS database

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JUNE 1998

OSHA ANALYTICAL METHOD #ID-120

*** END OF RECORD ***

Last Revision Date: 1/11/2012**SECTION 1 - CHEMICAL PRODUCT and COMPANY IDENTIFICATION**

Catalog Number: M-CSM8080U99
Description: Pesticide Control Sample Mixture in Toluene
Product is: Mixture

Supplied by CHEM SERVICE, Inc. PO BOX 599, WEST CHESTER, PA 19381 (610)-692-3026
EMERGENCY PHONE: 1-610-692-3026

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

The following compounds are contained in this mixture at the stated concentrations:

<u>CONC</u>	<u>ANALYTE</u>	<u>CAS</u>
100ug/ml	4,4'-DDD	72-54-8
100ug/ml	4,4'-DDT	50-29-3
100ug/ml	b-Endosulfan	33213-65-9
100ug/ml	Endosulfan sulfate	1031-07-8
100ug/ml	Endrin	72-20-8
20ug/ml	Heptachlor	76-44-8
20ug/ml	BHC (alpha isomer)	319-84-6
20ug/ml	BHC (beta isomer)	319-85-7
20ug/ml	a-Endosulfan	959-98-8
20ug/ml	Heptachlor epoxide (Isomer B)	1024-57-3
20ug/ml	Aldrin	309-00-2
20ug/ml	Dieldrin	60-57-1
20ug/ml	4,4'-DDE	72-55-9

SECTION 3 - HAZARDS IDENTIFICATION

Contact lenses should not be worn in the laboratory. All chemicals should be considered hazardous -
Avoid direct physical contact!

For the solvent: Toluene

Can cause eye irritation. Prolonged exposure may cause nausea/headache/dizziness and/or eye damage. May be harmful if inhaled. Dust and/or vapors can cause irritation to respiratory tract. Can be irritating to mucous membranes.

May be harmful if swallowed. Can cause gastro-intestinal disturbances. Can cause blood disorders. Exposure can cause liver damage. Exposure can cause kidney damage.

Can cause skin irritation. May be harmful if absorbed through the skin. May be rapidly absorbed through the skin with potential adverse health effects.

Can cause delayed adverse health effects. Can cause nervous system injury.

Avoid consumption of alcohol before and after handling of this compound because it will increase the toxicity of the compound. Narcotic at high concentrations.

This chemical is considered to cause DEVELOPMENTAL TOXICITY by the state of California.

SECTION 4 - FIRST AID MEASURES

An antidote is a substance intended to counteract the effect of a poison. It should be administered only by a physician or trained emergency personnel. Medical advice can be obtained from a POISON CONTROL CENTER.

For the solvent: Toluene

In case of contact: Flush eyes continuously with water for 15-20 minutes. Flush skin with water for 15-20 minutes. If no burns have occurred-use soap and water to cleanse skin. If inhaled remove patient to fresh air. Administer oxygen if patient is having difficulty breathing. If patient has stopped breathing administer artificial respirations. If patient is in cardiac arrest administer CPR. Continue life supporting measures until medical assistance has arrived. Contact Poison Control Center immediately if necessary.

Remove and wash contaminated clothing. If patient is exhibiting signs of shock - Keep warm and quiet.

If swallowed DO NOT induce vomiting. If taken internally give milk, milk of magnesia or egg whites beaten with water. Do not administer liquids or induce vomiting to an unconscious or convulsing person. If patient is vomiting-watch closely to make sure airway does not become obstructed by vomit.

Get medical attention if necessary.

SECTION 5 - FIRE AND EXPLOSION DATA

For the solvent: Toluene

Flash Point: 4.4°C

Extinguishing Media: Carbon dioxide or dry chemical powder. DO NOT USE WATER!

Lower Explosion Limit: 1.2%

Upper Explosion Limit: 7%

Autoignition Temperature: 535°C

NFPA Scale: 0 - Least, 1 - Slight, 2 - Moderate, 3 - High, 4 - Severe

NFPA Hazard Rating: Health: 2, Reactivity: 0, Flammability: 3

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills or Leaks: Evacuate area. Wear appropriate OSHA regulated equipment. Ventilate area. Absorb on vermiculite or similar material. Sweep up and place in an appropriate container. Hold for disposal.

Wash contaminated surfaces to remove any residue.

Remove contaminated clothing and wash before reuse.

SECTION 7 - HANDLING AND STORAGE

Handling: This chemical should be handled only in a hood. Eye shields should be worn. Use appropriate OSHA/MSHA approved safety equipment. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation. Wash thoroughly after handling.

Storage: Store in a cool dry place. Store only with compatible chemicals. Keep tightly closed.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

For the solvent: Toluene

OSHA PEL (TWA): 100 ppm (375mg/m³)

ACGIH TLV (TWA): 50ppm (147mg/m³)

ACGIH TLV (STEL): Data Not Available

Personal Protective Equipment

Eyes: Wear Safety Glasses.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to minimize contact with skin.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant the use of a respirator.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

For the solvent: Toluene

Color:	Colorless
Phase:	Liquid
Melting Point:	-95°C
Boiling Point:	110.6°C
Specific Gravity:	0.866g/mL @ 20°C
Vapor Density:	2.9
Vapor Pressure:	29.1hPa @ 20°C
Solubility in Water:	Very slightly soluble
Odor:	Aromatic
Evaporation Rate (Butyl acetate=1):	1.9
Molecular Weight:	92.14
Molecular Formula:	C ₇ H ₈

SECTION 10 - STABILITY AND REACTIVITY

For the solvent: Toluene

Flammable. Readily absorbed and retained on clothing and/or shoes.

Volatile. Incompatible with strong oxidizing agents. Decomposition liberates toxic fumes.

Hygroscopic.

SECTION 11 - TOXICOLOGY INFORMATION

Since this solution contains a very low concentration of active component, the primary hazard is from the solvent.

The LD50 for the minor component:

<u>ANALYTE</u>	<u>CAS</u>	<u>LD50</u>
4,4'-DDD	72-54-8	113 mg/kg
4,4'-DDT	50-29-3	87 mg/kg
b-Endosulfan	33213-65-9	240 mg/kg
Endosulfan sulfate	1031-07-8	18 mg/kg
Endrin	72-20-8	8 mg/kg
Heptachlor	76-44-8	40 mg/kg
BHC (alpha isomer)	319-84-6	177 mg/kg
BHC (beta isomer)	319-85-7	6,000 mg/kg
a-Endosulfan	959-98-8	76 mg/kg
Heptachlor epoxide (Isomer B)	1024-57-3	15 mg/kg
Aldrin	309-00-2	38 mg/kg
Dieldrin	60-57-1	38 mg/kg
4,4'-DDE	72-55-9	880 mg/kg

For the solvent: Toluene

RTECS:	XS5250000
Oral Rat or Mouse LD50:	5000.0 mg/kg
Dermal Rat or Mouse LD50:	N/A mg/kg
Rat or Mouse LC50 :	49 g/m ³ (4h)

Carcinogenicity

OSHA:	NO
IARC:	NO Details: 3

NTP: NO
ACGIH: NO Details: A4
NIOSH: NO
Other: NO

Property 65: This chemical is considered to cause DEVELOPMENTAL TOXICITY by the state of California.

Carcinogenicity

For the minor component:

4,4'-DDD	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	Yes	<u>NIOSH</u>	No	<u>ACGIH</u>	No
4,4'-DDT	<u>OSHA</u>	No	<u>NTP</u>	Yes	<u>IARC</u>	Yes	<u>NIOSH</u>	Yes	<u>ACGIH</u>	No
Heptachlor	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	Yes	<u>NIOSH</u>	Yes	<u>ACGIH</u>	Yes
BHC (alpha isomer)	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	Yes	<u>NIOSH</u>	No	<u>ACGIH</u>	No
BHC (beta isomer)	<u>OSHA</u>	No	<u>NTP</u>	Yes	<u>IARC</u>	Yes	<u>NIOSH</u>	No	<u>ACGIH</u>	No
Heptachlor epoxide (Isomer B)	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	Yes	<u>NIOSH</u>	No	<u>ACGIH</u>	No
Aldrin	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	No	<u>NIOSH</u>	Yes	<u>ACGIH</u>	No
Dieldrin	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	No	<u>NIOSH</u>	Yes	<u>ACGIH</u>	No
4,4'-DDE	<u>OSHA</u>	No	<u>NTP</u>	No	<u>IARC</u>	Yes	<u>NIOSH</u>	No	<u>ACGIH</u>	No

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
Environmental Fate: Not Available

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: Dispose in accordance with Federal, State and Local regulations.

SECTION 14 - TRANSPORTATION INFORMATION

For the solvent: Toluene

UN Number: UN1294
Class: 3
Packing Group: II
Proper Shipping Name: Toluene

SECTION 15 - REGULATORY INFORMATION

For the solvent: Toluene

European Labeling in Accordance with EC Directives

Hazard Symbols: F, Xn

Risk Phrases:

-R11: Highly Flammable.
-R20: Harmful by inhalation.

Safety Phrases:

-S16: Keep away from sources of ignition - No smoking.
-S25: Avoid contact with the eyes.
-S29: Do not empty into drains.
-S33: Take precautionary measures against static discharges.

SECTION 16 - OTHER INFORMATION

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded MSDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

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This product is furnished FOR LABORATORY USE ONLY!

Chem Service Inc. Material Safety Data Sheet

Last Revised On: 11/3/2011

SECTION 1 - CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Catalog Number: S-10875M1
Description: 4,4'-DDE
Product is: Solution
Other Name(s): 1,1-Dichloro-2,2-bis[p-chlorophenyl]ethylene/p,p'-DDE/1,1
-(Dichloroethenylidene)bis[4-chlorobenzene]
Supplied by CHEM SERVICE, Inc. PO BOX 599, WEST CHESTER, PA 19381 (610)-692-3026
EMERGENCY PHONE: 1-610-692-3026

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS No.: 72-55-9
Description: 4,4'-DDE Solution
Concentration: 100ug/mL in Methanol
EINECS No.: 200-784-6
Hazard Symbols: XN

SECTION 3 - HAZARDS IDENTIFICATION

Contact lenses should not be worn in the laboratory. All chemicals should be considered hazardous -
Avoid direct physical contact!

For the solvent: Methanol

Health Risks: May be fatal if absorbed through the skin! Repeated exposure to vapors and/or dust can cause eye injury. May be fatal if inhaled! Can cause cardiovascular system injury. Exposure can cause liver damage. Exposure can cause kidney damage. May be fatal or cause blindness if swallowed. Can cause gastro-intestinal disturbances. Can cause convulsions.

Property 65: Data Not Available

SECTION 4 - FIRST AID MEASURES

An antidote is a substance intended to counteract the effect of a poison. It should be administered only by a physician or trained emergency personnel. Medical advice can be obtained from a POISON CONTROL CENTER.

For the solvent: Methanol

First Aid: In case of contact: Flush eyes continuously with water for 15-20 minutes. Flush skin with water for 15-20 minutes. If patient has stopped breathing administer artificial respiration. If patient is in cardiac arrest administer CPR. Continue life supporting measures until medical assistance has arrived. Do not wear shoes or clothing until absolutely free of all chemical odors. Get medical attention if necessary. If no burns have occurred-use soap and water to cleanse skin. If inhaled remove patient to fresh air. Administer oxygen if patient is having difficulty breathing. If swallowed do not induce vomiting.

SECTION 5 - FIRE AND EXPLOSION DATA

For the solvent: Methanol

Flash Point: 11°C This is a flammable chemical.

Extinguishing Media: Carbon dioxide or dry chemical powder. DO NOT USE WATER!

Upper Explosion Limit: 36%

Lower Explosion Limit: 6.0%

Autoignition Temperature: 464°C

NFPA Scale: 0 - Least, 1 - Slight, 2 - Moderate, 3 - High, 4 - Severe

NFPA Hazard Rating: Health: 1. Reactivity: 0. Flammability: 3. Special: No Data.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills or Leaks: Evacuate area. Wear appropriate OSHA regulated equipment. Ventilate area.

Absorb on vermiculite or similar material. Sweep up and place in an appropriate container.

Hold for disposal.

Wash contaminated surfaces to remove any residue.

Remove contaminated clothing and wash before reuse.

SECTION 7 - HANDLING AND STORAGE

Handling: This chemical should be handled only in a hood. Eye shields should be worn.

Use appropriate OSHA/MSHA approved safety equipment. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation. Wash thoroughly after handling.

Storage:

Store in a cool dry place. Store only with compatible chemicals.

Keep tightly closed.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

For the solvent: Methanol

OSHA PEL (TWA): 200 ppm (260 mg/m³)

ACGIH TLV (TWA): 200 ppm (262 mg/m³)

ACGIH TLV (STEL): Data Not Available

Personal Protective Equipment

Eyes: Wear Safety Glasses.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to minimize contact with skin.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirators use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

For the solvent: Methanol

Color: Colorless

Phase: Liquid

Melting Point: -98°C

Boiling Point: 64.6°C

Specific Gravity: 0.791g/mL

Vapor Density: 1.11

Vapor Pressure: 130.3 hPa @ 20°C

Solubility in Water: Completely miscible.

Odor: Data Not Available

Evaporation Rate (Butyl acetate=1): Data Not Available

Molecular Weight: 32.05
Molecular Formula: CH₄O

SECTION 10 - STABILITY AND REACTIVITY

For the solvent: Methanol

Reacts with Acid halides and anhydrides. Flammable. Incompatible with strong acids. Incompatible with strong reducing agents. Incompatible with strong oxidizing agents. Decomposition liberates toxic fumes. Hygroscopic. Incompatible with active metals (e.g. Sodium).

SECTION 11 - TOXICOLOGY INFORMATION

The primary hazards for this solution are predominantly from the solvent.

For the solvent: Methanol

RTECS: PC1400000

Oral Rat or Mouse LD₅₀: 5628 mg/kg

Dermal Rat or Mouse LD₅₀: N/A mg/kg

Rat or Mouse LC₅₀ : 64000 ppm/8H

Carcinogenicity

OSHA: NO

IARC: NO

NTP: NO

ACGIH: NO

NIOSH: NO

Other: NO

Property 65: Data Not Available

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not Available

Environmental Fate: Not Available

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: Dispose in accordance with Federal, State and Local regulations.

SECTION 14 - TRANSPORTATION INFORMATION

For the solvent: Methanol

UN Number: UN1230

Class: 3

Packing Group: II

Proper Shipping Name: Methanol

SECTION 15 - REGULATORY INFORMATION

For the solvent: Methanol

European Labeling in Accordance with EC Directives

Hazard Symbols: T F

Risk Phrases

R11 Highly Flammable.

R23/25 Toxic by inhalation and if swallowed.

Safety Phrases

S16 Keep away from sources of ignition- No smoking.

S2 Keep out of reach of children.

S24	Avoid contact with the skin.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).
S7	Keep container tightly closed

SECTION 16 - OTHER INFORMATION

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded MSDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Material Safety Data Sheet (MSDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an MSDS for a solution or mixture the user should refer to the MSDS for every component of the solution or mixture. Chem Service warrants that this MSDS is based upon the most current information available to Chem Service at the time it was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. This MSDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES. Copyright © 2011 Chem Service, Inc. All rights reserved except that this MSDS may be printed for the use of a customer or prospective customer of Chem Service, Inc provided the entire MSDS is printed. The MSDS may not be placed in any database or otherwise stored or distributed in electronic or any other form.

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Safety data for dibenz(a,h)anthracene



[Glossary](#) of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2:5,6-benzanthracene, 1,2:5,6-dibenzanthracene, dibenzo(a,h)anthracene, DBA, 1,2,5,6-DBA

Use: a common pollutant in smoke and used oils

Molecular formula: $C_{22}H_{14}$

CAS No: 53-70-3

EINECS No: 200-181-8

Annex I Index. No: 601-041-00-2

Physical data

Appearance: white to light yellow crystalline solid

Melting point: 266 - 267 C

Boiling point: 524 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$): 1.28

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Harmful if swallowed or inhaled. Experimental carcinogen, tumorigen and neoplastigen. IARC probable human carcinogen.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given [here.](#))

IVN-MUS LDLO 10 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here.](#))
R45 R50 R53.

Environmental information

Harmful in the environment - may cause long-term damage.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here.](#))

Non-hazardous for air, sea and road freight.

Personal protection

Safety glasses, gloves, good ventilation. Handle as a possible carcinogen.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here.](#))

S45 S53 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

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SAFETY DATA SHEET

Version 3.7
Revision Date 11/25/2014
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Dibenzofuran

Product Number : 236373
Brand : Aldrich

CAS-No. : 132-64-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Warning

Hazard statement(s)

H302 : Harmful if swallowed.
H411 : Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264 : Wash skin thoroughly after handling.
P270 : Do not eat, drink or smoke when using this product.
P273 : Avoid release to the environment.
P301 + P312 + P330 : IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P391 : Collect spillage.
P501 : Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Diphenylene oxide

Formula : C₁₂H₈O

Molecular weight : 168.19 g/mol

CAS-No. : 132-64-9

EC-No. : 205-071-3

Hazardous components

Component	Classification	Concentration
Dibenzofuran		
	Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an

industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: crystalline Colour: white, beige
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 80 - 82 °C (176 - 180 °F) - lit.
f) Initial boiling point and boiling range	154 - 155 °C (309 - 311 °F) at 27 hPa (20 mmHg) - lit.
g) Flash point	130.0 °C (266.0 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 3.77
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: HP4430000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish NOEC - Cyprinodon variegatus (sheepshead minnow) - 1 mg/l - 96.0 h
LC50 - Pimephales promelas (fathead minnow) - 1.05 mg/l - 96.0 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Dibenzofuran)
Marine pollutant: yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:
CAS-No. Revision Date

Dibenzofuran 132-64-9 2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.7

Revision Date: 11/25/2014

Print Date: 01/29/2016

SAFETY DATA SHEET

Version 5.5

Revision Date 02/28/2015

Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Dieldrin

Product Number : 291218

Brand : Aldrich

Index-No. : 602-049-00-9

CAS-No. : 60-57-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 2), H300

Acute toxicity, Dermal (Category 3), H311

Carcinogenicity (Category 2), H351

Specific target organ toxicity - repeated exposure, Oral (Category 1), H372

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H300 Fatal if swallowed.

H311 Toxic in contact with skin.

H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,2,3,4,10,10-Hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene

Formula : C₁₂H₈Cl₆O
Molecular weight : 380.91 g/mol
CAS-No. : 60-57-1
EC-No. : 200-484-5
Index-No. : 602-049-00-9

Hazardous components

Component	Classification	Concentration
Dieldrin		
	Acute Tox. 2; Acute Tox. 3; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H300, H311, H351, H372, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Dieldrin	60-57-1	TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Liver damage Reproductive effects Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

		TWA	0.250000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		
		TWA	0.250000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--------------------|-------------------|
| a) Appearance | Form: solid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |

d) pH	No data available
e) Melting point/freezing point	Melting point/range: 143 - 144 °C (289 - 291 °F)
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Mouse - 38.0 mg/kg

LD50 Oral - Dog - 65.0 mg/kg

LD50 Oral - Monkey - 3.0 mg/kg

LD50 Oral - Rabbit - 45.0 mg/kg

LD50 Oral - Pig - 38.0 mg/kg

LD50 Oral - Guinea pig - 49.0 mg/kg

LD50 Oral - Hamster - 60.0 mg/kg

LD50 Oral - Pigeon - 23.7 mg/kg

LD50 Oral - Chicken - 20.0 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Miosis (pupillary constriction). Behavioral:Excitement. Behavioral:Food intake (animal).

LD50 Oral - Quail - 10.8 mg/kg

Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Irritability.

LD50 Oral - Duck - 381.0 mg/kg

LD50 Oral - Mammal - 94.0 mg/kg

Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold.

LD50 Oral - Bird (wild) - 13.3 mg/kg

LDLO Oral - Rat - 30.0 mg/kg

Remarks: Liver:Other changes.

LDLO Oral - Human - male - 65.0 mg/kg

LDLO Oral - Cat - 500 mg/kg

Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - Rat - 140 mg/kg

Remarks: Liver:Other changes. Blood:Other changes. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Other esterases.

TDLo Oral - Rat - 109 mg/kg

Remarks: Liver:Changes in liver weight.

TDLo Oral - Rat - 88 mg/kg

Remarks: Behavioral:Food intake (animal). Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Phosphatases.

Inhalation: No data available

LD50 Dermal - Rabbit - 250.0 mg/kg

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Dieldrin)
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: IO1750000

Discomfort, Headache, Nausea, Vomiting, Dizziness, Tremors, tonic convulsions, clonic spasms, Coma., respiratory failure, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood - Irregularities - Based on Human Evidence

Blood - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish mortality LC50 - *Carassius auratus* (goldfish) - 1.6 µg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates Immobilization EC50 - *Daphnia magna* (Water flea) - 79.5 µg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Dieldrin)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Dieldrin)
Marine pollutant: yes

IATA

UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s. (Dieldrin)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	60-57-1	2007-09-28
Dieldrin		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H300	Fatal if swallowed.
H311	Toxic in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5

Revision Date: 02/28/2015

Print Date: 02/09/2016

MSDS SUMMARY SHEET

Manufacturer:

Name: PHILLIPS PETROLEUM COMPANY

Address 1:

Address 2:

Address 3:

CSZ: BARTLESVILLE **State:** OK **Zipcode:** 74004

Emergency phone: (800) 424-9300

Business phone: 800-762-0942

Product:

Ferndale MSDS#: 1354 **Version # :** 6

Manufacturer MSDS#: 0041

Current? : 2002

Name:

NO. 2 DIESEL FUEL

Synonyms:

CARB **Diesel** TF3

CARB **Diesel**

CARB **Diesel** 10%

Diesel Fuel Oil

EPA Low Sulfur **Diesel** Fuel

EPA Low Sulfur **Diesel** Fuel – Dyed

EPA Off Road High Sulfur **Diesel** – Dyed

Fuel Oil No. 2 – CAS # 68476-30-2

No. 2 **Diesel** Fuel Oil

No. 2 Fuel Oil – Non Hiway – Dyed

No. 2 High Sulfur **Diesel** – Dyed

No. 2 Low Sulfur **Diesel** - Dyed

No. 2 Low Sulfur **Diesel** - Undyed

Crude column 3rd IR

Crude column 3rd side cut

Atmospheric tower 3rd side cut

Ultra Low Sulfur **Diesel** No. 2

Finished **Diesel**

DHT Reactor Feed

Straight Run **Diesel**

Diesel

Middle Distillate

Product/Catalog Numbers:

MSDS Date: 01/01/2002 (**received:** 01/14/2002)

NFPA codes:

Health: 0 **Flammability:** 2 **Reactivity:** 0

MATERIAL SAFETY DATA SHEET
No. 2 Diesel Fuel**1. PRODUCT AND COMPANY IDENTIFICATION**

Product Name: No. 2 Diesel Fuel
Product Code: Multiple
SAP Code:
Synonyms: 1354
CARB Diesel TF3
CARB Diesel
CARB Diesel 10%
Diesel Fuel Oil
EPA Low Sulfur Diesel Fuel
EPA Low Sulfur Diesel Fuel – Dyed
EPA Off Road High Sulfur Diesel – Dyed
Fuel Oil No. 2 – CAS # 68476-30-2
No. 2 Diesel Fuel Oil
No. 2 Fuel Oil – Non Hiway – Dyed
No. 2 High Sulfur Diesel – Dyed
No. 2 Low Sulfur Diesel - Dyed
No. 2 Low Sulfur Diesel – Undyed
No. 2 Ultra Low Sulfur Diesel – Dyed
No. 2 Ultra Low Sulfur Diesel - Undyed
Intended Use: Fuel

Chemical Family:

Responsible Party: Phillip's Petroleum Company
Bartlesville, Oklahoma 74004

For Additional MSDSs: 800-762-0942

Technical Information:

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

EMERGENCY OVERVIEW**24 Hour Emergency Telephone Numbers:**

Spill, Leak, Fire or Accident

California Poison Control System: 800-356-3120

Call CHEMTREC

North America: (800) 424-9300

Others: (703) 527-3887 (collect)

Health Hazards/Precautionary Measures: Causes severe skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Flammable liquid and vapor. Keep away from heat, sparks, flames, static electricity or other sources of ignition.

Appearance: Straw-colored to dyed red
Physical Form: Liquid
Odor: Characteristic petroleum

HFPA Hazard Class:

Health: 0 (Least)
 Flammability: 2 (Moderate)
 Reactivity: 0 (Least)

HMIS Hazard Class

Not Evaluated

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>HAZARDOUS COMPONENTS</u>	<u>% VOLUME</u>	<u>Limits</u>	<u>EXPOSURE GUIDELINE</u>	
			<u>Agency</u>	<u>Type</u>
Diesel Fuel No. 2 CAS# 68476-34-6	100	100* mg/m3	ACGIH	TWA-SKIN
Naphthalene CAS# 91-20-3	<1	10ppm	ACGIH	TWA
		15ppm	ACGIH	STEL
		10ppm	OSHA	TWA
		250ppm	NIOSH	IDLH

All components are listed on the TSCA inventory

Tosco Low Sulfur No. 2 Diesel meets the specifications of 40 CFR 60.41 for low sulfur diesel fuel.

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

*Proposed ACGIH (1999)

3. HAZARDS IDENTIFICATION**Potential Health Effects:**

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Severe skin irritant. Contact may cause redness, itching, burning, and severe skin damage. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin, leading to dermatitis (inflammation). Not actually toxic by skin absorption, but prolonged or repeated skin contact may be harmful (see Section 11).

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): Low degree of toxicity by ingestion. ASPIRATION HAZARD – This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.

Signs and Symptoms: Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea, diarrhea and transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Cancer: Possible skin cancer hazard (see Sections 11 and 14).

Target Organs: There is limited evidence from animal studies that overexposure may cause injury to the kidney (see Section 11).

Developmental: Inadequate data available for this material.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders and kidney disorders.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Immediately remove contaminated shoes, clothing, and constrictive jewelry and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek immediate medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek immediate medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard; Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

5. FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >125°F/>52°

OSHA Flammability Class: Combustible liquid

LEL %: 0.3 / UEL %; 10.0

Autoignition Temperature: 500°F/260°C

Unusual Fire & Explosion Hazards: This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharged. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing or high pressure hydraulic oil equipment.

“Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area “No Smoking or Open Flame.” Store only in approved containers. Keep away from incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentration below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrants a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact, possible irritation and skin damage (see glove manufacturer literature for information on permeability). Depending on conditions of use, apron and/or arm covers may be necessary.

Eyes/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse. It is recommended that impervious clothing be worn when skin contact is possible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1atm).

Appearance: Straw-colored to dyed red

Physical State: Liquid

Odor: Characteristic petroleum

pH: unavailable

Vapor Pressure (mm Hg): 0.40

Vapor Density (air=1): >3

Boiling Point/Range: 320-700°F /160-371°C

Freezing/Melting Point: No Data

Solubility in Water: Negligible

Specific Gravity: 0.81-0.88 @ 60°F

Percent Volatile: Negligible

Evaporation Rate (nBuAc=1): <1

Viscosity: 32.6-40.0 SUS @ 100°F

Bulk Density: 7.08 lbs/gal

Flash Point: >125°F / >52°C

Flammable/Explosive Limits (%): LEL: 0.3 / UEL: 10.0

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 and 7).

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc.

Hazardous Decomposition Products: The use of hydrocarbon fuels in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. ACGIH has included a TLV of 0.05 mg/m³ TWA for diesel exhaust particulate on its 1999 Notice of Intended Changes. See Section 11 for additional information on hazards of engine exhaust.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Diesel Fuel No. 2 (CAS# 68476-34-6)

Carcinogenicity: Chronic dermal application of certain middle distillate streams contained in diesel fuel No. 2 resulted in an increased incidence of skin tumors in mice. This material has not been identified as carcinogen by NTP, IARC, or OSHA. Diesel exhaust is a probable cancer hazard based on tests with laboratory animals.

Target Organ(s): Limited evidence of renal impairment has been noted from a few case reports involving excessive exposure to diesel fuel No. 2.

Naphthalene (CAS# 91-20-3)

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has not been identified as a carcinogen by IARC or OSHA.

12. ECOLOGICAL INFORMATION

Not evaluated at this time

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic(s) of ignitability (D001) and benzene (D018). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container ?insate? could be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller containers, consult with state and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

DOT Shipping Description: Diesel Fuel, NA1983
Non-Bulk Package Marking: Diesel Fuel, 3, NA 1993, III

15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories):

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactive Hazard:	No

SARA 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Component	CAS Number	Weight %
-----------	------------	----------

-- None known --

California Proposition 65:

Warning: This material contains the following chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Effect
Benzene	Cancer, Developmental and Reproductive Toxicant
Toluene	Developmental Toxicant

Diesel engine exhaust, while not a component of this material, is on the Proposition 65 list of chemicals known to the State of California to cause cancer.

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any. Diesel exhaust is a probable cancer hazard based on tests in laboratory animals. It has been identified as carcinogen by IARC.

EPA (CERCLA Reportable Quantity): None

16. OTHER INFORMATION

Issue Date: 01/01/02

Previous Issue Date: 05/15/01

Product Code: Multiple

Revised Sections: None

Previous Product Code: Multiple

MSDS Number: 0041

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Data Safety Sheet is based on data believed to be accurate as of the date this Material Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THE PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Tosco Refining Company
Ferndale Refinery
UltraLow Sulfur Diesel Product Specification

Ferndale Product Code:34380xx (5) Product Code: ULSD2

(COMETS)

Specification	Unit	Limit	Test Procedure	Typical
Appearance				
Water & Sediment	Vol %	0.05 Max	D 2709	
Color	Number	3.0 Max	D 1500	
Haze Rating	Rating	2 Max	D 4176	
Composition				
Carbon Residue (Ramsbottom)	Wt %	0.35 Max	D 524, D 189	
Volatility				
90% Recovered	Deg; F	540 Min	D 86	
	Deg; F	640 Min	D 86	
Flash Point	Deg; F	125 Min (1)	D 93	130 F
Gravity	API	30 Min	D 287, D4052	
Fluidity				
Pour Point	Deg; F	See Season Table (6)	D 97	
Cloud Point	Deg; F	See Season Table (6)	D 2500	10 F
Viscosity @ 104F	cSt	1.9 Min	D 445	
	cSt	4.1 Max	D 445	
Lubricity, SLBOCLE	grams	3100 Min	D 6078	3300gm
Lubricity, HFRR	mm	.45	D 6079	
Combustion				
Cetane Index or Cetane Number (3,4)	Number	40.0 Min	D 976, D613	47.0
Corrosion				
Copper Strip, 3hr @ 50 deg C	Number	3 Max (2)	D 130	
Aromatics (4)	Vol %	35 Max	D 1319	25 %
Contaminants				
Total Sulfur	PPM	30 Max	D 2622, D4294	15-20ppm
Water & Sediment	Vol %	0.05 Max	D 1796	
Ash	Wt %	0.01 Max	D 482	
Additives				
Cetane Improver	Lb/MBbl	675 Max		
Dye		Undyed		

1. Minimum release specification is 125 deg. F. The refinery should target 135 deg. F.
2. Test result reported as a number and letter (e.g. 1a). Any letter is allowable as long as the number meets the spec shown.
3. Either specification must be met.
4. Either cetane index minimum or aromatics maximum must be met.
5. Winter cloud and pour specifications may be relaxed to the summer specifications by agreement with the customer.
6. Season Table

Month	Product Code	Pour Point	Cloud Point
Jan, Feb, Nov, Dec	WI	0 max (5)	14 max (5)
Mar - Oct	SU	15 max	24 max



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Safety Data Sheet

Material Name: ETHYL BENZENE

SDS ID: MAT08780

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

ETHYL BENZENE

Synonyms

MTG MSDS 185; EB; PHENYLETHANE; ETHYLBENZENE; ETHYLBENZOL; ALPHA-METHYLTOLUENE; UN 1175; C₈H₁₀

Chemical Family

Hydrocarbons, aromatic

Product Use

industrial.

Restrictions on Use

None known.

Details of the supplier of the safety data sheet

MATHESON TRI-GAS, INC.

150 Allen Road, Suite 302

Basking Ridge, NJ 07920

General Information: 1-800-416-2505

Emergency #: 1-800-424-9300 (CHEMTREC)

Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

Flammable Liquids - Category 2

Aspiration Hazard - Category 1

Acute Toxicity - Inhalation - Dust/Mist - Category 4

Acute Toxicity - Inhalation - Vapor - Category 4

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Eye Irritation - Category 2A

Carcinogenicity - Category 2

Reproductive Toxicity - Category 1B

Specific target organ toxicity - Single exposure - Category 2

Specific target organ toxicity - Single exposure - Category 3

Specific Target Organ Toxicity - Repeated Exposure - Category 2 (ears , Ears)

Hazardous to the Aquatic Environment - Acute - Category 2

Hazardous to the Aquatic Environment - Chronic - Category 2

GHS Label Elements

Symbol(s)



Signal Word

Danger

Hazard Statement(s)



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Safety Data Sheet

Material Name: ETHYL BENZENE

SDS ID: MAT08780

Highly flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes serious eye irritation.
Suspected of causing cancer.
May damage fertility or the unborn child.
May cause damage to organs. (central nervous system)
May cause respiratory irritation.
May be fatal if swallowed and enters airways.
Toxic to aquatic life.

Precautionary Statement(s)

Prevention

Keep away from heat, sparks, open flame, and hot surfaces - No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use Personal Protective equipment as required.
Do not breathe vapor or mist.
Use only outdoors or in a well-ventilated area.
Wear protective gloves and eye/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire, use media appropriate for extinction.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Do NOT induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool.
Keep container tightly closed.
Store locked up.

Disposal

Dispose in accordance with all applicable regulations.

Statement(s) of Unknown Acute Toxicity

Inhalation 0% of the mixture consists of ingredient(s) of unknown acute toxicity.



Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780****Statement(s) of Unknown Aquatic Toxicity**

0% of the mixture consists of ingredient(s) of unknown acute aquatic toxicity.

0% of the mixture consists of ingredient(s) of unknown chronic aquatic toxicity.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
100-41-4	ETHYL BENZENE	100

Section 4 - FIRST AID MEASURES**Inhalation**

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion

aspiration hazard. Do NOT induce vomiting. When vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention immediately. Give artificial respiration if not breathing.

Most Important Symptoms/Effects**Acute**

respiratory tract irritation, skin irritation, eye irritation, central nervous system damage, lung damage (from aspiration)

Delayed

cancer, Reproductive Effects

Note to Physicians

For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES**Extinguishing Media****Suitable Extinguishing Media**

regular dry chemical, carbon dioxide, water spray, regular foam, Large fires: Use water spray, fog or regular foam.

Unsuitable Extinguishing Media

Do not use high-pressure water streams.

Special Hazards Arising from the Chemical

Severe fire hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

Hazardous Combustion Products

Oxides of carbon

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank,

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Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780**

rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. Eliminate all ignition sources if safe to do so. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if possible without personal risk. Prevent entry into waterways, sewers, basements, or confined areas. Reduce vapors with water spray. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Dike for later disposal. Remove sources of ignition. Use water spray to reduce vapors or divert vapor cloud drift. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

Environmental Precautions

Avoid release to the environment.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use Personal Protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves/eye protection/face protection. Wash hands thoroughly after handling. Do not eat, drink, or smoke when using this product. Avoid release to the environment.

Conditions for Safe Storage, Including any Incompatibilities

Store in a well-ventilated place.

Keep cool.

Keep container tightly closed.

Store locked up.

Store and handle in accordance with all current regulations and standards. Store in a well-ventilated area. Keep cool. Keep container tightly closed. Keep locked up. Grounding and bonding required. Keep separated from incompatible substances. Protect from physical damage. Store outside or in a detached building. Store with flammable liquids. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106.

Incompatible Materials

Acids, bases, oxidizing materials, combustible materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits**ETHYL BENZENE****100-41-4**



Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780**

ACGIH:	20 ppm TWA
NIOSH:	100 ppm TWA ; 435 mg/m3 TWA
	125 ppm STEL ; 545 mg/m3 STEL
	800 ppm IDLH (10% LEL)
Europe:	100 ppm TWA ; 442 mg/m3 TWA
	Possibility of significant uptake through the skin
	200 ppm STEL ; 884 mg/m3 STEL
OSHA (US):	100 ppm TWA ; 435 mg/m3 TWA
Mexico:	100 ppm TWA VLE-PPT ; 435 mg/m3 TWA VLE-PPT
	125 ppm STEL [PPT-CT] ; 545 mg/m3 STEL [PPT-CT]

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)**ETHYL BENZENE (100-41-4)**

0.15 g/g creatinine Medium: urine Time: end of shift Parameter: Sum of mandelic acid and phenylglyoxylic acid (nonspecific)

Engineering Controls

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment**Eye/face protection**

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection

Wear appropriate chemical resistant clothing.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. 800 ppm. Any air-purifying half-mask respirator equipped with organic vapor cartridge(s). Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister. Any powered, air-purifying respirator with organic vapor cartridge(s). Any supplied-air respirator. Any self-contained breathing apparatus with a full facepiece. Emergency or planned entry into unknown concentrations or IDLH conditions -. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Escape -. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister. Any appropriate escape-type, self-contained breathing apparatus. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Glove Recommendations

Wear appropriate chemical resistant gloves.



Safety Data Sheet

Material Name: ETHYL BENZENE

SDS ID: MAT08780

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, colorless liquid	Physical State	liquid
Odor	aromatic odor	Color	colorless
Odor Threshold	140 ppm	pH	Not available
Melting Point	-95 °C (-139 °F)	Boiling Point	136 °C (277 °F)
Boiling Point Range	Not available	Freezing point	Not available
Evaporation Rate	<1 (Butyl acetate = 1)	Flammability (solid, gas)	Not available
Autoignition Temperature	432 °C (810 °F)	Flash Point	15 °C Closed Cup (59 °F)
Lower Explosive Limit	0.8 %	Decomposition temperature	Not available
Upper Explosive Limit	6.7 %	Vapor Pressure	7.1 mmHg @ 20 °C
Vapor Density (air=1)	3.66	Specific Gravity (water=1)	0.867
Water Solubility	0.015 %	Partition coefficient: n-octanol/water	154170.05
Viscosity	0.64 cp	Kinematic viscosity	Not available
Solubility (Other)	Not available	Bioconcentration Factor (BCF)	36.39
Density	Not available	Henry's Law Constant	0.00788 atm-m ³ /mole
KOC	520 (Estimated)	Physical Form	liquid
Volatility	100 %	Molecular Formula	C-H ₃ -C-H ₂ -C ₆ -H ₅
Molecular Weight	106.17	OSHA Flammability Class	IB

Solvent Solubility**Soluble**

alcohol, ether, Benzene, sulfur dioxide, carbon tetrachloride

Insoluble

ammonia

Section 10 - STABILITY AND REACTIVITY**Reactivity**

No reactivity hazard is expected.

Chemical Stability

Stable at normal temperatures and pressure.



Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780****Possibility of Hazardous Reactions**

Will not polymerize.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

Incompatible Materials

Acids, bases, oxidizing materials, combustible materials

Hazardous decomposition products

Oxides of carbon

Section 11 - TOXICOLOGICAL INFORMATION**Information on Likely Routes of Exposure****Inhalation**

irritation (possibly severe), chest pain, difficulty breathing, emotional disturbances, headache, drowsiness, dizziness, loss of coordination, coma, cancer

Skin Contact

irritation

Eye Contact

irritation

Ingestion

nausea, vomiting, stomach pain, aspiration hazard

Acute and Chronic Toxicity**Component Analysis - LD50/LC50**

The components of this material have been reviewed in various sources and the following selected endpoints are published:

ETHYL BENZENE (100-41-4)

Oral LD50 Rat 3500 mg/kg

Dermal LD50 Rabbit 15400 mg/kg

Inhalation LC50 Rat 17.4 mg/L 4 h

Product Toxicity Data**Acute Toxicity Estimate**

Dermal	> 2000 mg/kg
Inhalation - Vapor	17.4 mg/L
Oral	> 2000 mg/kg

Immediate Effects

respiratory tract irritation, skin irritation, eye irritation, central nervous system damage, lung damage (from aspiration)

Delayed Effects

Reproductive Effects, cancer

Irritation/Corrosivity Data

respiratory tract irritation, skin irritation, eye irritation

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity



Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780**

ETHYL BENZENE	100-41-4
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC:	Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))
DFG:	Category 4 (no significant contribution to human cancer)
OSHA:	Present

Germ Cell Mutagenicity

No data available.

Tumorigenic Data

No data available

Reproductive Toxicity

Available data characterizes components of this product as reproductive hazards.

Specific Target Organ Toxicity - Single Exposure

central nervous system, Respiratory system

Specific Target Organ Toxicity - Repeated Exposure

No target organs identified.

Aspiration hazard

This material is an aspiration hazard.

Medical Conditions Aggravated by Exposure

kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies

Additional Data

May cross the placenta.

Section 12 - ECOLOGICAL INFORMATION**Ecotoxicity**

Toxic to aquatic life.

Component Analysis - Aquatic Toxicity

ETHYL BENZENE	100-41-4
Fish:	LC50 96 h Oncorhynchus mykiss 11 - 18 mg/L [static]; LC50 96 h Oncorhynchus mykiss 4.2 mg/L [semi-static]; LC50 96 h Pimephales promelas 7.55 - 11 mg/L [flow-through]; LC50 96 h Lepomis macrochirus 32 mg/L [static]; LC50 96 h Pimephales promelas 9.1 - 15.6 mg/L [static]; LC50 96 h Poecilia reticulata 9.6 mg/L [static]
Algae:	EC50 72 h Pseudokirchneriella subcapitata 4.6 mg/L IUCLID ; EC50 96 h Pseudokirchneriella subcapitata >438 mg/L IUCLID ; EC50 72 h Pseudokirchneriella subcapitata 2.6 - 11.3 mg/L [static] EPA ; EC50 96 h Pseudokirchneriella subcapitata 1.7 - 7.6 mg/L [static] EPA
Invertebrate:	EC50 48 h Daphnia magna 1.8 - 2.4 mg/L IUCLID

Persistence and Degradability

Not expected to undergo hydrolysis in the environment.

Bioaccumulative Potential

Bioconcentration potential in aquatic organisms is low based on a BCF value of 15.

Mobility

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Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780**

Expected to have moderate mobility in soil.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.

Hazardous Waste Number(s): D001.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:**Shipping Name:** ETHYLBENZENE**Hazard Class:** 3**UN/NA #:** UN1175**Packing Group:** II**Required Label(s):** 3

Marine pollutant

IMDG Information:**Shipping Name:** ETHYLBENZENE**Hazard Class:** 3**UN#:** UN1175**Packing Group:** II**Required Label(s):** 3

Marine pollutant

International Bulk Chemical Code

This material contains one or more of the following chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

ETHYL BENZENE	100-41-4
IBC Code:	Category Y

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

ETHYL BENZENE	100-41-4
SARA 313:	0.1 % de minimis concentration
CERCLA:	1000 lb final RQ ; 454 kg final RQ

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories

Flammable; Carcinogenicity; Acute toxicity; Reproductive Toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity; Aspiration Hazard

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:



Safety Data Sheet

Material Name: ETHYL BENZENE

SDS ID: MAT08780

Component	CAS	CA	MA	MN	NJ	PA
ETHYL BENZENE	100-41-4	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer

ETHYL BENZENE	100-41-4
Carc:	carcinogen , 6/11/2004

Canada Regulations

Canadian WHMIS Ingredient Disclosure List (IDL)

Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

ETHYL BENZENE	100-41-4
	0.1 %

WHMIS Classification

B2

Component Analysis - Inventory

ETHYL BENZENE (100-41-4)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN - NCI (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings

Health: 2 Fire: 3 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes

Updated: 05/01/2015

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research



Safety Data Sheet

Material Name: ETHYL BENZENE**SDS ID: MAT08780**

on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; NDSL - Non-Domestic Substance List (Canada); NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL - Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH - Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TCCA - Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW - Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN NCI (Draft) - Vietnam National Chemicals Inventory (NCI) (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada) .

Other Information**Disclaimer:**

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MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NON-FLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas:Oxygen, 0.0015-23.5%;Methane, 0.0005-2.5%;Carbon Monoxide, 0.0005-1.0%; Hydrogen Sulfide, 0.001-0.025%

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Not Applicable

FORMULA: Not Applicable

Document Number: 50018

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
	General MSDS Information 1-713/868-0440
	Fax on Demand: 1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		NIOSH IDLH ppm	OTHER ppm
			TLV ppm	STEL ppm	PEL ppm	STEL ppm		
Oxygen	7782-44-7	0.0015 - 23.5%	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5%.					
Methane	74-82-8	0.0005 - 2.5%	There are no specific exposure limits for Methane. Methane is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Hydrogen Sulfide	7783-06-4	0.001- 0.025 %	10 (NIC = 5)	15	10 (Vacated 1989 PEL)	20 (ceiling); 50 (ceiling, 10 min. peak once per 8-hour shift 15 (vacated 1989 PEL)	100	NIOSH REL: STEL = 10 (ceiling) 10 minutes DFG-MAKs: TWA = 10 PEAK = 2•MAK, 10 min., momentary value
Carbon Monoxide	630-08-0	0.0005 - 1.0%	25	NE	50 35 (Vacated 1989 PEL)	200 [ceiling] (Vacated 1989 PEL)	1200	NIOSH RELS: TWA = 35 STEL = 200 (ceiling) DFG MAKs: TWA = 30 PEAK = 2•MAK, 15 min., average value DFG MAK Pregnancy Risk Classification: B
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established. NIC = Notice of Intended Change See Section 16 for Definitions of Terms Used.
NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This gas mixture is a colorless gas which has a rotten-egg odor (due to the presence of Hydrogen Sulfide). The odor cannot be relied on as an adequate warning of the presence of this gas mixture, because olfactory fatigue occurs after over-exposure to Hydrogen Sulfide. Hydrogen Sulfide and Carbon Monoxide (another component of this gas mixture) are toxic to humans in relatively low concentrations. Over-exposure to this gas mixture can cause skin or eye irritation, nausea, dizziness, headaches, collapse, unconsciousness, coma, and death. Additionally, releases of this gas mixture may produce oxygen-deficient atmospheres (especially in small confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. A potential health hazard associated with this gas mixture is the potential of inhalation of Hydrogen Sulfide, a component of this gas mixture. Such over-exposures may occur if this gas mixture is used in a confined space or other poorly-ventilated area. Over-exposures to Hydrogen Sulfide can cause dizziness, headache, and nausea. Over-exposure to this gas could result in respiratory arrest, coma, or unconsciousness, due to the presence of Hydrogen Sulfide. Continuous inhalation of low concentrations of Hydrogen Sulfide may cause olfactory fatigue, so that the odor is no longer an effective warning of the presence of this gas. A summary of exposure concentrations and observed effects are as follows:

CONCENTRATION OF HYDROGEN SULFIDE

0.3-30 ppm
50 ppm
Slightly higher than 50 ppm
100-150 ppm
200-250 ppm

300-500
500 ppm

> 600 ppm
> 1000 ppm

NOTE:

here are presented to delineate the complete health effects which have been observed for humans after exposure to Hydrogen Sulfide.

OBSERVED EFFECT

Odor is unpleasant.
Eye irritation. Dryness and irritation of nose, throat.
Irritation of the respiratory system.
Temporary loss of smell.
Headache, vomiting nausea. Prolonged exposure may lead to lung damage. Exposures of 4-8 hours can be fatal.
Swifter onset of symptoms. Death occurs in 1-4 hours.
Headache, excitement, staggering, and stomach ache after brief exposure. Death occurs within 0.5 - 1 hour of exposure.
Rapid onset of unconsciousness, coma, death.
Immediate respiratory arrest.

This gas mixture contains a maximum of 250 ppm Hydrogen Sulfide. The higher concentration values here are presented to delineate the complete health effects which have been observed for humans after exposure to Hydrogen Sulfide.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD	(BLUE)	3	
FLAMMABILITY HAZARD	(RED)	0	
PHYSICAL HAZARD	(YELLOW)	0	
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
See Section 8			
For Routine Industrial Use and Handling Applications			

3. HAZARD IDENTIFICATION (continued)

Inhalation over-exposures to atmospheres containing more than the Threshold Limit Value of Carbon Monoxide (25 ppm), another component of this gas mixture, can result in serious health consequences. Carbon Monoxide is classified as a chemical asphyxiant, producing a toxic action by combining with the hemoglobin of the blood and replacing the available oxygen. Through this replacement, the body is deprived of the required oxygen, and asphyxiation occurs. Since the affinity of Carbon Monoxide for hemoglobin is about 200-300 times that of oxygen, only a small amount of Carbon Monoxide will cause a toxic reaction to occur. Carbon Monoxide exposures in excess of 50 ppm will produce symptoms of poisoning if breathed for a sufficiently long time. If this gas mixture is released in a small, poorly ventilated area (i.e. an enclosed or confined space), symptoms which may develop include the following:

CONCENTRATION OF CARBON MONOXIDE

All exposure levels:

200 ppm:
400 ppm:
1,000 -2000 ppm:

200-2500 ppm:

>2500 ppm:

Additionally, if mixtures of this gas mixture contain less than 19.5% Oxygen and are released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN

12-16% Oxygen:
10-14% Oxygen:
6-10% Oxygen:
Below 6%:

OBSERVED EFFECT

Over-exposure to Carbon Monoxide can be indicated by the lips and fingernails turning bright red.
Slight symptoms (i.e. headache) after several hours of exposure.
Headache and discomfort experienced within 2-3 hours of exposure.
Within 30 minutes, slight palpitations of the heart occurs. Within 1.5 hours, there is a tendency to stagger.
Within 2 hours, there is mental confusion, headaches, and nausea. Unconsciousness within 30 minutes.

Potential for collapse and death before warning symptoms.

OBSERVED EFFECT

Breathing and pulse rate increased, muscular coordination slightly disturbed.
Emotional upset, abnormal fatigue, disturbed respiration.
Nausea, vomiting, collapse, or loss of consciousness.
Convulsive movements, possible respiratory collapse, and death.

SKIN and EYE CONTACT: Hydrogen Sulfide, a component of this gas mixture, may be irritating to the skin. Inflammation and irritation of the eyes can occur at very low airborne concentration of Hydrogen Sulfide (less than 10 ppm). Exposure over several hours may result in "gas eyes" or "sore eyes" with symptoms of scratchiness, irritation, tearing and burning. Above 50 ppm of Hydrogen Sulfide, there is an intense tearing, blurring of vision, and pain when looking at light. Over-exposed individuals may see rings around bright lights. Most symptoms disappear when exposure ceases. However, in serious cases, the eye can be permanently damaged.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this gas mixture may cause the following health effects:

ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. However the Hydrogen Sulfide and Carbon Monoxide components of this gas mixture are toxic to humans. Over-exposure to this gas mixture can cause nausea, dizziness, headaches, collapse, unconsciousness, coma, and death. Due to the presence of Hydrogen Sulfide, over-exposures to this gas mixture can also irritate the skin and eyes; severe eye contamination can result in blindness.

CHRONIC: Severe over-exposures to the Hydrogen Sulfide component of this gas mixture, which do not result in death, may cause long-term symptoms such as memory loss, paralysis of facial muscles, or nerve tissue damage. In serious cases of over-exposure, the eyes can be permanently damaged. Skin disorders and respiratory conditions may be aggravated by repeated over-exposures to this gas product. Refer to Section 11 (Toxicology Information) for additional information on the components of this gas mixture. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, blood system, central nervous system effects, cardiovascular system, skin, eyes. CHRONIC: Neurological system, reproductive system, eyes.

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, **Self-Contained Breathing Apparatus must be worn.** Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary.

SKIN EXPOSURE: If irritation of the skin develops after exposure to this gas mixture, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

EYE EXPOSURE: If irritation of the eye develops after exposure to this gas mixture, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions may be aggravated by over-exposure to this gas mixture. Carbon Monoxide, a component of this gas mixture, can aggravate some diseases of the cardiovascular system, such as coronary artery disease and angina pectoris. Because of the presence of Hydrogen Sulfide, eye disorders or skin problems may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure. Hyperbaric oxygen is the most efficient antidote to Carbon Monoxide poisoning, the optimum range being 2-2.5 atm. A special mask, or, preferably, a compression chamber to utilize oxygen at these pressures is required. Avoid administering stimulant drugs. Be observant for initial signs of pulmonary edema in the event of severe inhalation over-exposures.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

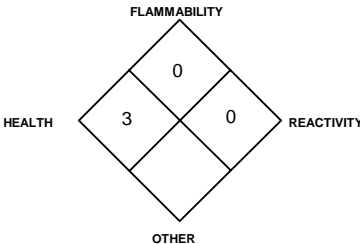
UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture contains toxic gases, Hydrogen Sulfide and Carbon Monoxide, and presents an health hazard to firefighters. This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of over-exposure to Hydrogen Sulfide and Carbon Monoxide, the toxic components of this gas mixture, and other safety hazards related to the remaining components of this gas mixture, than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel. For emergency disposal,

6. ACCIDENTAL RELEASE MEASURES (continued)

secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for Hydrogen Sulfide, Carbon Monoxide, and Oxygen. Hydrogen Sulfide and Carbon Monoxide level must be below exposure level listed in Section 2 (Composition and Information on Ingredients) and Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area. If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify cylinders containing a gas mixture with Hydrogen Sulfide or Carbon Monoxide. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Eye wash stations/safety showers should be near areas where this gas mixture is used or stored. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. All work practices should minimize releases of Hydrogen Sulfide and Carbon Monoxide-containing gas mixtures.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C (70°F)). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING! Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Oxygen, Hydrogen Sulfide, and Carbon Monoxide.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if the levels of components exceeds exposure limits presented in Section 2 (Composition and Information of Ingredients) and Oxygen levels are below 19.5%, or unknown, during emergency response to a release of this gas mixture. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.16.33% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following NIOSH respiratory protection recommendations for Hydrogen Sulfide and Carbon Monoxide are provided for further information.

NIOSH/OSHA RECOMMENDATIONS FOR HYDROGEN SULFIDE CONCENTRATIONS IN AIR:
Up to 100 ppm: Powered air-purifying respirator with cartridge(s) to protect against hydrogen sulfide; gas mask with canister to protect against hydrogen sulfide; or SAR; or full-facepiece SCBA.
Emergency or Planned Entry into Unknown Concentration or IDLH Conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
Escape: Gas mask with canister to protect against hydrogen sulfide; or escape-type SCBA
NOTE: The IDLH concentration for Hydrogen Sulfide is 100 ppm.

NIOSH/OSHA RECOMMENDATIONS FOR CARBON MONOXIDE CONCENTRATIONS IN AIR:
Up to 350 ppm Supplied Air Respirator (SAR)
Up to 875 ppm Supplied Air Respirator (SAR) operated in a continuous flow mode.
Up to 1200 ppm Gas mask with canister to protect against carbon monoxide; or full-facepiece SCBA; or full-facepiece Supplied Air Respirator (SAR).
Emergency or Planned Entry into Unknown Concentration or IDLH Conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece Supplied Air Respirator (SAR) with an auxiliary positive pressure SCBA.
Escape: Gas mask with canister to protect against carbon monoxide; or escape-type SCBA.
NOTE: End of Service Life Indicator (ESLI) required for gas masks.
NOTE: The IDLH concentration for Carbon Monoxide is 1200 ppm.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, the main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: .072 lbs/ ft ³ (1.153 kg/m ³)	BOILING POINT: -320.4°F (-195.8°C)
FREEZING/MELTING POINT @ 10 psig: -345.8°F (-210°C)	pH: Not applicable.
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906	MOLECULAR WEIGHT: 28.01
SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023	EXPANSION RATIO: Not applicable.
EVAPORATION RATE (nBuAc = 1): Not applicable.	SPECIFIC VOLUME (ft³/lb): 13.8
VAPOR PRESSURE @ 70°F (21.1°C) (psig): Not applicable.	
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.	

The following information is for this gas mixture.

ODOR THRESHOLD: 0.13 ppm (Hydrogen Sulfide)
APPEARANCE AND COLOR: This gas mixture is a colorless gas which has an rotten egg-like odor, due to the presence of Hydrogen Sulfide.
HOW TO DETECT THIS SUBSTANCE (warning properties): Continuous inhalation of low concentrations of this gas mixture may cause olfactory fatigue, due to the presence of Hydrogen Sulfide, so the odor is not a good warning property of a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation. Wet lead acetate paper can be used for leak detection. The paper turns black in the presence of Hydrogen Sulfide. Cadmium chloride solutions can also be used. Cadmium solutions will turn yellow upon contact with Hydrogen Sulfide.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.
DECOMPOSITION PRODUCTS: The thermal decomposition products of Methane include carbon oxides. The decomposition products of Hydrogen Sulfide include water and sulfur oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in Nitrogen (the main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this gas mixture (Hydrogen Sulfide, Methane) are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). Carbon Monoxide is mildly corrosive to nickel and iron (especially at high temperatures and pressures). Hydrogen Sulfide is corrosive to most metals, because it reacts with these substances to form metal sulfides.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this gas mixture:

NITROGEN:

There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

METHANE:

There are no specific toxicology data for Methane. Methane is a simple asphyxiant, which acts to displace oxygen in the environment.

CARBON MONOXIDE:

LC₅₀ (Inhalation-Rat) 1807 ppm/4 hours
LC₅₀ (Inhalation-Mouse) 2444 ppm/4 hours
LC₅₀ (Inhalation-Guinea Pig) 5718 ppm/4 hours
LC₅₀ (Inhalation-wild bird species) 1334 ppm
LCLo (Inhalation-Human) 4 mg/m³/12 hours:
Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Blood: methemoglobinemia-carboxyhemoglobin
LCLo (Inhalation-Man) 4000 ppm/30 minutes
LCLo (Inhalation-Human) 5000 ppm/5 minutes
LCLo (Inhalation-Dog) 4000 ppm/46 minutes
LCLo (Inhalation-Rabbit) 4000 ppm
LCLo (Inhalation-Mammal-species unspecified) 5000 ppm/5 minutes
TCLo (Inhalation-Human) 600 mg/m³/10 minutes:
Behavioral: headache
TCLo (Inhalation-Man) 650 ppm/45 minutes: Blood: methemoglobinemia-carboxyhemoglobin; Behavioral: changes in psychophysiological tests
TCLo (Inhalation-Rat) 1800 ppm/1 hour/14 days-intermittent: Cardiac: other changes
TCLo (Inhalation-Rat) 30 mg/m³/8 hours/10 weeks-intermittent: Brain and Coverings: other degenerative changes; Behavioral: muscle contraction or spasticity
TCLo (Inhalation-Rat) 96 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes
TCLo (Inhalation-Rat) 250 ppm/5 hours/20 days-intermittent: Blood :pigmented or nucleated red blood cells, changes in other cell count (unspecified), changes in erythrocyte (RBC) count
TDLo (Subcutaneous-Rat) 5983 mg/kg/18 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)
TCLo (Inhalation-Monkey) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes
TCLo (Inhalation-Rabbit) 200 mg/m³/3 hours/13 weeks-intermittent: Brain and Coverings: other degenerative changes; Cardiac: other changes; Blood: hemorrhage
TCLo (Inhalation-Guinea Pig) 200 mg/m³/5 hours/30 weeks-continuous: Cardiac: arrhythmias (including changes in conduction), EKG changes not diagnostic of specified effects, pulse rate increase, without fall in BP

CARBON MONOXIDE (continued):

TCLo (Inhalation-Mouse) 50 ppm/30 days-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi
TCLo (Inhalation-Guinea Pig) 200 mg/m³/5 hours/4 weeks-intermittent: Endocrine: hyperglycemia
TCLo (Inhalation-Guinea Pig) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes
TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Newborn: behavioral
TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Specific Developmental Abnormalities: cardiovascular (circulatory) system
TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain), behavioral
TCLo (Inhalation-Rat) 1 mg/m³/24 hours: female 72 day(s) pre-mating: Reproductive: Maternal Effects: menstrual cycle changes or disorders, parturition; Fertility: female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)
TCLo (Inhalation-Rat) 150 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Effects on Newborn: behavioral
TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Specific Developmental Abnormalities: immune and reticuloendothelial system
TCLo (Inhalation-Mouse) 65 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Newborn: behavioral
TCLo (Inhalation-Mouse) 250 ppm/7 hours: female 6-15 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Specific Developmental Abnormalities: musculoskeletal system
TCLo (Inhalation-Mouse) 125 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)
TCLo (Inhalation-Mouse) 8 pph/1 hour: female 8 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), fetal death

CARBON MONOXIDE (continued):

TCLo (Inhalation-Rabbit) 50 ppm/24 hours/8 weeks-continuous: Blood: changes in platelet count
TCLo (Inhalation-Mouse) 8 pph/1 hour: female 8 day(s) after conception: Reproductive: Specific Developmental Abnormalities: Central Nervous System
TCLo (Inhalation-Rabbit) 180 ppm/24 hours: female 1-30 day(s) after conception: Reproductive: Effects on Newborn: stillbirth, viability index (e.g., # alive at day 4 per # born alive)
Micronucleus Test (Inhalation-Mouse)1500 ppm/10 minutes
Sister Chromatid Exchange (Inhalation-Mouse) 2500 ppm/10 minutes
HYDROGEN SULFIDE:
LC₅₀ (Inhalation-Rat) 444 ppm: Lungs, Thorax, or Respiration: other changes; Gastrointestinal: hypermotility, diarrhea; Kidney, Ureter, Bladder: urine volume increased
LC₅₀ (Inhalation-Mouse) 634 ppm/1 hour
LCLo (Inhalation-Human) 600 ppm/30 minutes
LCLo (Inhalation-Man) 5700 µg/kg: Behavioral: coma; Lungs, Thorax, or Respiration: chronic pulmonary edema
LCLo (Inhalation-Human) 800 ppm/5 minutes
LCLo (Inhalation-Mammal-species unspecified) 800 ppm/5 minutes
TCLo (Inhalation-Rat) 30 ppm/6 hours/10 weeks-intermittent: Sense Organs and Special Senses (Olfaction): olfactory nerve change, effect, not otherwise specified
TCLo (Inhalation-Rat) 1200 mg/m³/2 hours/5 days-intermittent: Brain and Coverings: other degenerative changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase
TCLo (Inhalation-Rat) 100 ppm/8 hours/5 weeks-intermittent: Brain and Coverings: other degenerative changes; Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: cytochrome oxidases (including oxidative phosphorylation)
TCLo (Inhalation-Rat) 80 ppm/6 hours/90 days-intermittent: Brain and Coverings: changes in brain weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain
TCLo (Inhalation-Rat) 20 ppm: female 6-22 day(s) after conception lactating female 21 day(s) post-birth: Reproductive: Effects on Newborn: physical
TCLo (Inhalation-Mouse) 80 ppm/6 hours/90 days-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: death
TCLo (Inhalation-Rabbit) 40 mg/m³/5 hours/30 weeks-intermittent: Sense Organs and Special Senses (Eye): conjunctive irritation

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This gas mixture is irritating to the eyes, and may be irritating to the skin.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not known to be skin or respiratory sensitizers.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture on the human reproductive system.

Mutagenicity: The components of this gas mixture are not reported to cause mutagenic effects in humans.

REPRODUCTIVE TOXICITY INFORMATION (continued):

Embryotoxicity: This gas mixture contains components that may cause embryotoxic effects in humans; however, due to the small total amount of the components, embryotoxic effects are not expected to occur.

Teratogenicity: This gas mixture is not expected to cause teratogenic effects in humans due to the small cylinder size and small total amount of all components. The Carbon Monoxide component of this gas mixture which exists up to 1%, can cause teratogenic effects in humans. Severe exposure to Carbon Monoxide during pregnancy has caused adverse effects and the death of the fetus. In general, maternal symptoms are an indicator of the potential risk to the fetus since Carbon Monoxide is toxic to the mother before it is toxic to the fetus.

Reproductive Toxicity: The components of this gas mixture are not reported to cause adverse reproductive effects in humans.

A *mutagen* is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An *embryotoxin* is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A *teratogen* is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES (BEIs): Biological Exposure Indices (BEIs) have been determined for components of this gas mixture, as follows:

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
CARBON MONOXIDE • Carboxyhemoglobin in blood • Carbon monoxide in end-exhaled air	• End of shift • End of shift	• 3.5% of hemoglobin • 20 ppm

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

CARBON MONOXIDE:

Atmospheric Fate: A photochemical model was used to quantify the sensitivity of the tropospheric oxidants ozone (O₃) and OH to changes in methane (CH₄), Carbon Monoxide (CO), and NO emissions and to perturbations in climate and stratospheric chemistry. In most cases, increased CH₄ and CO emissions will suppress OH (negative coefficients) in increased O₃ (positive coefficients) except in areas where NO and O₃ influenced by pollution are sufficient to increased OH. In most regions, NO, CO, and CH₄ emission increased will suppress OH and increased O₃, but these trends may be opposed by stratospheric O3 depletion and climate change.

HYDROGEN SULFIDE:

Water Solubility = 1 g/242 mL at 20°C.
Plant toxicity: Continuous fumigation of plants with 300 or 3000 ppb Hydrogen Sulfide caused leaf lesions, defoliation, and reduced growth with severity of injury correlated to dose. At higher (3.25 and 5.03 ppm) Hydrogen Sulfide, significant reductions in leaf CO2 and water vapor exchanges occurred, and stomatal openings were depressed. When Hydrogen Sulfide gas was applied to 29 species of green plants for 5 hours, young, rapidly elongating tissues were more sensitive to injury than older tissues. Symptoms included scorching of young shoots and

12. ECOLOGICAL INFORMATION(continued)

leaves, basal and marginal scorching of older leaves. Mature leaves were unaffected. Seeds exposed to Hydrogen Sulfide gas showed delay in germination.

Persistence: Converts to elemental sulfur upon standing in water.

Major Species Threatened: Aquatic and animal life plants may be injured if exposed to 5 ppm in air over 24 hours.

Biodegradation: Microorganisms in soil and water are involved in oxidation-reduction reactions that oxidize hydrogen sulfide to elemental sulfur. Members of the genera Beggiatoa, Thioploca, and Thiotrix function in transition zones between aerobic and anaerobic conditions where both molecular oxygen and hydrogen sulfide are found. Also, some photosynthetic bacteria oxidize hydrogen sulfide to elemental sulfur. Members of the families Chlorobiaceae and Chromatiaceae (purple sulfur bacteria) are obligate aerobes and are phototrophic, and are found in waters with high H₂S concentrations. The interactions of these organisms form part of the global sulfur cycle.

Bioconcentration: Does not have bioaccumulation or food chain contamination potential.

NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C; 1.6 volumes Nitrogen/100 volumes water at 20°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this gas mixture's effects on plant and animal life. Hydrogen Sulfide and Carbon Monoxide, components of this gas mixture, can be deadly to exposed animal life, producing symptoms similar to those experienced by humans. This gas mixture may also be harmful to plant life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this gas mixture's effects on aquatic life. The presence of more than a trace of the Carbon Monoxide component of this gas mixture is a hazard to fish. The following aquatic toxicity data are available for the Hydrogen Sulfide component of this gas mixture:

HYDROGEN SULFIDE:	HYDROGEN SULFIDE (continued):	HYDROGEN SULFIDE (continued):
LC ₅₀ (<i>Asellus</i> arthropods) 96 hours = 0.111 mg/L	LC ₅₀ ,F (bluegill, 35-day-old fry) 96 hours = 0.0131 mg/L	Lethal (goldfish) 96 hours = 10 mg/L
LC ₅₀ (<i>Crangon</i> arthropods) 96 hours = 1.07 mg/L	LC ₅₀ ,F (bluegill, juveniles) 96 hours = 0.0478 mg/L	Toxic (carp) 24 hours = 3.3 mg/L
LC ₅₀ (<i>Gammarus</i> arthropods) 96 hours = 0.84 mg/L	LC ₅₀ ,F (bluegill, adults) 96 hours = 0.0448 mg/L	Toxic (goldfish) 24 hours = 4.3 mg/L
LC ₅₀ (Ephemera) 96 hours = 0.316 mg/L	LC ₅₀ ,F (fathead minnows) 96 hours = 0.0071-0.55 mg/L	Toxic (sunfish) 1 hour = 4.9 to 5.3 mg/L
LC ₅₀ (Inhalation-Flies) > 960 minutes = 380 mg/m ³	LC ₅₀ ,F (bluegill) 96 hours = 0.0090-0.0140 mg/L	Toxic (goldfish) 200 hours = 5 mg/L
LC ₅₀ (Inhalation-Flies) 7 minutes = 1,500 mg/m ³	LC ₅₀ ,F (brook trout) 96 hours = 0.0216-0.0308 mg/L	Toxic (minnows) 24 hours = 5-6 mg/L
LC ₅₀ ,F (bluegill, eggs) 72 hours = 0.0190 mg/L	Toxic (goldfish) = 100 mg/L	Toxic (carp) 24 hours = 6-25 mg/L
		Toxic (trout) 15 minutes = 10 mg/L
		Toxic (goldfish) 24 hours = 25 mg/L
		Toxic (tench) 3 hours = 100 mg/L
		MATC,F (fathead minnows) 0.0037 mg/L
		MATC,F (bluegill) 0.0004 mg/L
		MATC,F (brook trout) 0.055 mg/L

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

DOT LABEL(S) REQUIRED: Non-Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION (continued):

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Note: DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas mixture is considered as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

HAZARD LABEL: Class 2.2 (Non-Flammable Gas)

SPECIAL PROVISIONS: None

EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12

ERAP INDEX: 3000

PASSENGER CARRYING SHIP INDEX: Forbidden

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: Forbidden

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: This gas mixture is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Hydrogen Sulfide	YES	YES	YES

U.S. SARA THRESHOLD PLANNING QUANTITY: Hydrogen Sulfide = 500 lb (227 kg)

U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Hydrogen Sulfide = 100 lb (45 kg)

OTHER U.S. FEDERAL REGULATIONS:

- Hydrogen Sulfide and Carbon Monoxide are subject to the reporting requirements of CFR 29 1910.1000.
- Hydrogen Sulfide and Methane are subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for each of these gases is 10,000 pounds and so this mixture will not be affected by the regulation.
- Depending on specific operations involving the use of this gas mixture, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Hydrogen Sulfide is listed in Appendix A of this regulation. The Threshold Quantity for Hydrogen Sulfide under this regulation is 1500 lbs (and so one cylinder of this gas mixture will not be affected by this regulation).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Nitrogen and Oxygen are not listed Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Hydrogen Sulfide is listed under this regulation in Table 1 as a Regulated Substance (Toxic Substance), in quantities of 10,000 lbs (4,553 kg) or greater.

15. REGULATORY INFORMATION(continued)

Carbon Monoxide and Methane are listed under this regulation in Table 3, as Regulated Substances (Flammable), in quantities of 10,000 lbs (4,553 kg) or greater, and so this mixture will not be affected by the regulation.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: Carbon Monoxide, Hydrogen Sulfide, Methane.	Michigan - Critical Materials Register: No.	Pennsylvania - Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.
California - Permissible Exposure Limits for Chemical Contaminants: Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.	Minnesota - List of Hazardous Substances: Carbon Monoxide, Hydrogen Sulfide, Methane.	Rhode Island - Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.
Florida - Substance List: Oxygen, Carbon Monoxide, Hydrogen Sulfide	Missouri - Employer Information/Toxic Substance List t: Hydrogen Sulfide, Methane.	Texas - Hazardous Substance List: Hydrogen Sulfide.
Illinois - Toxic Substance List: Carbon Monoxide, Methane, Hydrogen Sulfide.	New Jersey - Right to Know Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Methane.	West Virginia - Hazardous Substance List: Hydrogen Sulfide.
Kansas - Section 302/313 List: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: Hydrogen Sulfide.	Wisconsin - Toxic and Hazardous Substances: Hydrogen Sulfide
Massachusetts - Substance List: Oxygen, Carbon Monoxide, Hydrogen Sulfide, Methane.		

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Carbon Monoxide component of this gas mixture is on the California Proposition 65 lists. WARNING! This gas mixture contains a compound known to the State of California to cause birth defects or other reproductive harm.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.
CANADIAN WHMIS CLASSIFICATION: This gas mixture is categorized as a Controlled Product, Hazard Classes A and D2A, as per the Controlled Product Regulations.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. CALGAZ will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

- P-1 "Safe Handling of Compressed Gases in Containers"
- AV-1 "Safe Handling and Storage of Compressed Gases"
- "Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609

Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of CALGAZ knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

SAFETY DATA SHEET



Helium

Section 1. Identification

GHS product identifier	: Helium
Chemical name	: Helium
Other means of identification	: helium (dot); Helium-4; He; o-Helium; UN 1046
Product use	: Synthetic/Analytical chemistry.
Synonym	: helium (dot); Helium-4; He; o-Helium; UN 1046
SDS #	: 001025
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Emergency telephone number (with hours of operation)	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms



Signal word

: Warning

Hazard statements

: Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General

: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention

: Use and store only outdoors or in a well ventilated place.

Response

: Not applicable.

Storage

: Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal

: Not applicable.

Hazards not otherwise classified

: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Date of issue/Date of revision

: 10/15/2014.

Date of previous issue

: 10/2/2014.

Version : 0.02

1/11

Section 3. Composition/information on ingredients

Substance/mixture : Substance
Chemical name : Helium
Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

CAS number/other identifiers

CAS number : 7440-59-7
Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Frostbite : Try to warm up the frozen tissues and seek medical attention.
Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Section 4. First aid measures

- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Hazardous thermal decomposition products** : No specific data.

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Gas. [Compressed gas.]
- Color** : Colorless.
- Molecular weight** : 4 g/mole
- Molecular formula** : He
- Boiling/condensation point** : -268.9°C (-452°F)
- Melting/freezing point** : -272.2°C (-458°F)
- Critical temperature** : -267.9°C (-450.2°F)
- Odor** : Odorless.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : [Product does not sustain combustion.]
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft³ (125 kg/m³)
- Specific Volume (ft³/lb)** : 96.1538
- Gas Density (lb/ft³)** : 0.0104
- Relative density** : Not applicable.
- Solubility** : Not available.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : 0.28
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.

Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Helium	0.28	-	low

Mobility in soil






Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	Limited quantity Yes. Packaging instruction Passenger aircraft Quantity limitation: 75 kg Cargo aircraft Quantity limitation: 150 kg	Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75	-	-	Passenger and Cargo Aircraft Quantity limitation: 75 kg Cargo Aircraft Only Quantity limitation: 150 kg

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

Section 15. Regulatory information

International lists

- Australia inventory (AICS):** This material is listed or exempted.
- China inventory (IECSC):** This material is listed or exempted.
- Japan inventory:** Not determined.
- Korea inventory:** This material is listed or exempted.
- Malaysia Inventory (EHS Register):** Not determined.
- New Zealand Inventory of Chemicals (NZIoC):** This material is listed or exempted.
- Philippines inventory (PICCS):** This material is listed or exempted.
- Taiwan inventory (CSNN):** Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: This material is not listed.

Canadian ARET: This material is not listed.

Canadian NPRI: This material is not listed.

Alberta Designated Substances: This material is not listed.

Ontario Designated Substances: This material is not listed.

Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 10/15/2014.

Date of issue/Date of revision : 10/15/2014.

Date of previous issue : 10/2/2014.

Version : 0.02

Key to abbreviations :

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- UN = United Nations
- ACGIH – American Conference of Governmental Industrial Hygienists
- AIHA – American Industrial Hygiene Association
- CAS – Chemical Abstract Services
- CEPA – Canadian Environmental Protection Act
- CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
- CFR – United States Code of Federal Regulations
- CPR – Controlled Products Regulations
- DSL – Domestic Substances List
- GWP – Global Warming Potential
- IARC – International Agency for Research on Cancer
- ICAO – International Civil Aviation Organisation
- Inh – Inhalation
- LC – Lethal concentration
- LD – Lethal dosage
- NDSL – Non-Domestic Substances List
- NIOSH – National Institute for Occupational Safety and Health
- TDG – Canadian Transportation of Dangerous Goods Act and Regulations
- TLV – Threshold Limit Value
- TSCA – Toxic Substances Control Act
- WEEL – Workplace Environmental Exposure Level
- WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MATERIAL SAFETY DATA SHEET
HORIBA INSTRUMENTS, INC.
17671 Armstrong Avenue, Irvine, CA 92614
(949) 250-4811

REVISION DATE MAY 2003

SECTION I: MATERIAL IDENTIFICATION

IDENTITY: Potassium hydrogen phthalate
P/N 350623, 527033, 696138-1, 9003001600, 100-4

CHEMICAL FORMULA: $C_6H_4(COOK)(COOH)$ ~1% in water

GENERIC NAME: pH 4 Buffer Solution

CHEMICAL FAMILY: Salt solution

OTHER DESIGNATION: pH 4 Standard Solution, Autocal solution, 100-4

IN CASE OF EMERGENCY CONTACT YOUR REGIONAL PLANT MANAGER

SECTION II: HAZARDOUS INGREDIENTS

Irritant: Eyes, nose and throat, skin.

This product contains the following toxic chemical(s) subject to Section 313
Title III reporting requirements (40 CFR Part 372): NONE

SECTION III: PHYSICAL DATA

MELTING POINT (*): 295-300 °C	SPECIFIC GRAVITY (H ₂ O = 1): 1.636	
VAPOR PRESSURE: N/A	PERCENT, VOLATILE BY VOLUME (%): None	
SOLUBILITY IN WATER v/v @°C:	1.2% (cool water)	CAS #: 877-24-7
APPEARANCE AND ODOR:	Colorless liquid	

SECTION IV: PHYSICAL DATA

FLASH POINT AND METHOD:	N/A
FLAMMABLE LIMITS:	None
EXTINGUISHING MEDIA:	Determine based on surrounding combustibles.
SPECIAL FIRE FIGHTING PROCEDURES:	None
UNUSUAL FIRE AND EXPLOSION HAZARDS:	N/A

SECTION V: REACTIVITY DATA

STABILITY: Stable at normal temperature

INCOMPATIBILITY (MATERIALS TO AVOID):	None
HAZARDOUS DECOMPOSITION PRODUCTS:	None
HAZARDOUS POLYMERIZATION:	None

SECTION VI: HEALTH HAZARD DATA

EMERGENCY AND FIRST AID PROCEDURES:

Eyes: Wash eyes with clean water flowing for 10-15 minutes. Call doctor immediately.
Skin: Take off contaminated clothing and wash skin with water.
Inhaled: Move the patient into clear air. Keep patient warm and stable. Loosen clothing and use artificial respiration if necessary. Call doctor immediately.
Swallowed: Give patient plenty of warm water/milk. Induce vomiting. Call doctor immediately. If patient is unconscious, do not give water/milk, but call doctor immediately.

SECTION VII: SPILL OR LEAK PROCEDURES Highway or railway spills call Chemtrec
(800) 424-9300

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Collect as much material as possible. The place of leakage should be washed with plenty of water.

WASTE DISPOSAL METHOD:

Dispose as chemical waste.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE): Not normally required.

VENTILATION: Not normally required.

OTHER PROTECTIVE EQUIPMENT: Optional - eye mask, gloves and long-sleeve working clothes.

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

After working, wash hands thoroughly.

OTHER PRECAUTIONS: None.

For the following RAE Part Numbers:

600-0001-000, 600-0002-000

600-0002-001, 600-0026-000

600-0027-000, 600-0069-000



MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NONFLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas:

Oxygen 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Not Applicable

FORMULA: Not Applicable

Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
	General MSDS Information: 1-713/868-0440
	Fax on Demand: 1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH ppm	OTHER ppm
			TWA ppm	STEL ppm	TWA ppm	STEL ppm		
Isobutylene	115-11-7	0.0005-0.9%	There are no specific exposure limits for Isobutylene.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, odorless gas mixture. Releases of this gas mixture may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene, a component of this gas mixture, may cause drowsiness and other central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. The chief health hazard associated with this gas mixture is when this gas mixture contains less than 19.5% Oxygen and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space). Under this circumstance, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN

12-16% Oxygen:

10-14% Oxygen:

6-10% Oxygen:

Below 6%:

OBSERVED EFFECT

Breathing and pulse rate increase, muscular coordination slightly disturbed.

Emotional upset, abnormal fatigue, disturbed respiration.

Nausea, vomiting, collapse, or loss of consciousness.

Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this gas mixture may cause the following health effects:

ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color. Additionally, Isobutylene, a component of this gas mixture, may cause drowsiness or central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

CHRONIC: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
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FLAMMABILITY HAZARD	(RED)	0
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PHYSICAL HAZARD	(YELLOW)	0
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PROTECTIVE EQUIPMENT

EYES RESPIRATORY HANDS BODY

See Section 8

For Routine Industrial Use and Handling Applications

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

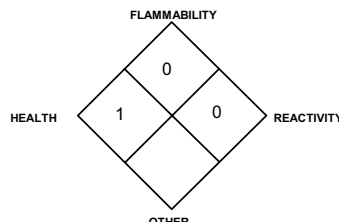
UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING! Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Nitrous Oxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Methane and Oxygen. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lbs/ ft³ (1.153 kg/m³)

BOILING POINT: -195.8°C (-320.4°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

The following information is for Oxygen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/cu ft (1.326 kg/m³)

FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105

SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm: 0.0491

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This is a colorless, odorless gas mixture.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)

pH: Not applicable.

MOLECULAR WEIGHT: 28.01

EXPANSION RATIO: Not applicable.

SPECIFIC VOLUME (ft³/lb): 13.8

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

BOILING POINT: -183.0°C (-297.4°F)

pH: Not applicable.

MOLECULAR WEIGHT: 32.00

EXPANSION RATIO: Not applicable.

VOLUME (ft³/lb): 12.1

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.

DECOMPOSITION PRODUCTS: The thermal decomposition products of Isobutylene include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in the Nitrogen component of this gas mixture. Lithium reacts slowly with Nitrogen at ambient temperatures. The Isobutylene component of this gas mixture is also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this gas mixture:

ISOBUTYLENE:

LC₅₀ (inhalation, rat) = 620,000 mg/kg/4 hours

LC₅₀ (inhalation, mouse) = 415,000 mg/kg

NITROGEN:

There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can be irritating to exposed skin and eyes.

SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to cause human skin or respiratory sensitization.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for the components in this gas mixture.

Embryotoxicity: No embryotoxic effects have been described for the components in this gas mixture.

Teratogenicity: No teratogenicity effects have been described for the components in this gas mixture.

Reproductive Toxicity: No reproductive toxicity effects have been described for the components in gas mixture.

A *mutagen* is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An *embryotoxin* is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A *teratogen* is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A *reproductive toxin* is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K_{ow} = -0.65

NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on the effects of this gas mixture on plant and animal life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Note: DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas is considered as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

HAZARD LABEL: Class 2.2 (Non-Flammable Gas)

SPECIAL PROVISIONS: None

EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12

ERAP INDEX: None

PASSENGER CARRYING SHIP INDEX: None

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

- No component of this gas mixture is subject to the requirements of CFR 29 1910.1000 (under the 1989 PELs).
- Isobutylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable (29 CFR 1910.119).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR Part 82).

15. REGULATORY INFORMATION (continued)

- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Isobutylene is listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,554 kg) or greater.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.
Florida - Substance List: Oxygen, Isobutylene.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen, Isobutylene.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: : No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this gas mixture is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. CALGAZ will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1	"Safe Handling of Compressed Gases in Containers"
AV-1	"Safe Handling and Storage of Compressed Gases"
	"Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609
Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of CALGAZ knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.



SAFETY DATA SHEET

Creation Date 08-Nov-2010

Revision Date 18-Jun-2015

Revision Number 2

1. Identification

Product Name Fluoranthene

Cat No. : AC119170000; AC119170250; AC119171000; AC119175000

Synonyms Benzo[j,k]fluorene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity

Category 4

Label Elements

Signal Word

Warning

Hazard Statements

Harmful if swallowed



Precautionary Statements

Prevention

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Fluoranthene	206-44-0	>95

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
Skin Contact	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.
Ingestion	Do not induce vomiting. Get medical attention.
Most important symptoms/effects Notes to Physician	No information available. Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO ₂). Dry chemical. alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	100 °C / 212 °F
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO₂)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
2

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment.
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Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Avoid dust formation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Light green
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	109 - 111 °C / 228.2 - 231.8 °F
Boiling Point/Range	384 - 34 °C / 723.2 - 93.2 °F
Flash Point	100 °C / 212 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16 H10
Molecular Weight	202.25

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Fluoranthene	2 g/kg (Rat)	3180 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	No information available
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Fluoranthene	206-44-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Fluoranthene	Not listed	Oncorhynchus mykiss: LC50=0.0077 mg/L 96h	Not listed	EC50: 0.78 mg/L 20h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility

Component	log Pow
Fluoranthene	5.33

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Fluoranthene - 206-44-0	U120	-

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
Proper technical name (Fluoranthene)
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
Hazard Class 9
Packing Group III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Fluoranthene	X	-	X	205-912-4	-		-	X	X	X	-

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Fluoranthene	206-44-0	>95	1.0 0.1

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Fluoranthene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Fluoranthene	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Fluoranthene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials



16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date

08-Nov-2010

Revision Date

18-Jun-2015

Print Date

18-Jun-2015

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name Fluorene

Cat No. : AC156130000; AC156130250; AC156131000; AC156135000

Synonyms Diphenylenemethane

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements

None required

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects
May form combustible dust concentrations in air

3. Composition / information on ingredients

Component	CAS-No	Weight %
Fluorene	86-73-7	98

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

	clothes and shoes. Obtain medical attention.
Inhalation	Remove from exposure, lie down. Move to fresh air. Obtain medical attention.
Ingestion	Clean mouth with water. Get medical attention.
Most important symptoms/effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO ₂). Dry chemical. chemical foam.
Unsuitable Extinguishing Media	No information available
Flash Point	151 °C / 303.8 °F
Method -	No information available
Autoignition Temperature	Not applicable
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Dust can form an explosive mixture in air. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products

None known

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
0

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions	Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.
Methods for Containment and Clean Up	Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling	Avoid contact with skin and eyes. Do not breathe dust. Do not ingest.
Storage	Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
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Engineering Measures	Ensure adequate ventilation, especially in confined areas.
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Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	No protective equipment is needed under normal use conditions.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	112 - 116 °C / 233.6 - 240.8 °F
Boiling Point/Range	298 °C / 568.4 °F @ 760 mmHg
Flash Point	151 °C / 303.8 °F
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	13 hPa @ 146 °C
Vapor Density	Not applicable
Relative Density	1.200
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C13 H10
Molecular Weight	166.22

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information**Acute Toxicity**

Product Information	No acute toxicity information is available for this product
Component Information	

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Fluorene	86-73-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and Degradability Insoluble in water May persist

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Fluorene	4.18

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated

TDG Not regulated

IATA

UN-No 3077

Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*

Hazard Class 9

Packing Group III

IMDG/IMO

UN-No 3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class 9
Packing Group III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Fluorene	X	X	-	201-695-5	-		X	X	X	X	-

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Fluorene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Fluorene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Fluorene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class B4 Flammable solid

**16. Other information**

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015

Print Date 10-Feb-2015

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088
EU/CLP GHS

Synonyms: #2 Heating Oil; 2 Oil; Off-road Diesel Fuel

*** Section 1 - Product and Company Identification ***

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquids - Category 3
Acute Toxicity, Inhalation - Category 4
Skin Corrosion/Irritation – Category 2
Eye Damage/Irritation – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) – Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes eye irritation.
Suspected of causing cancer.
Suspected of causing genetic defects.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Avoid breathing fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog or foam.
If on skin (or hair): Wash with plenty of soap and water. Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
If swallowed: Immediately call a poison center or doctor/physician if you feel unwell. Do NOT induce vomiting.

Storage

Store in a well ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-30-2	Fuel oil No. 2	100
91-20-3	Naphthalene	<0.1

A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when this product is loaded into tanks previously containing low flash point products (such as gasoline) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep containers closed and clearly labeled. Use approved vented storage containers. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers; Fluorel ®

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

*** Section 8 - Exposure Controls / Personal Protection ***

Component Exposure Limits

Fuel oil No. 2 (270-671-4)

- ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)
- Belgium: 100 mg/m3 TWA (as total hydrocarbon, aerosol and vapor)
Skin (listed under Gas oil)
- Portugal: 100 mg/m3 TWA [VLE-MP] (aerosol and vapor, as total Hydrocarbons, listed under Fuel diesel)

Naphthalene (202-049-5)

- ACGIH: 15 ppm STEL
10 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
- Austria: 10 ppm TWA [TMW]; 50 mg/m3 TWA [TMW]
skin notation
- Belgium: 15 ppm STEL; 80 mg/m3 STEL
10 ppm TWA; 53 mg/m3 TWA
Skin
- Denmark: 10 ppm TWA; 50 mg/m3 TWA
- Finland: 2 ppm STEL; 10 mg/m3 STEL
1 ppm TWA; 5 mg/m3 TWA
- France: 10 ppm TWA [VME]; 50 mg/m3 TWA [VME]
- Germany: 0.1 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1); 0.5 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1)
- Greece: 10 ppm TWA; 50 mg/m3 TWA
- Ireland: 15 ppm STEL; 75 mg/m3 STEL
10 ppm TWA; 50 mg/m3 TWA
- Netherlands: 80 mg/m3 STEL
50 mg/m3 TWA
- Portugal: 10 ppm TWA [VLE-MP]
- Spain: 15 ppm STEL [VLA-EC]; 80 mg/m3 STEL [VLA-EC]
10 ppm TWA [VLA-ED]; 53 mg/m3 TWA [VLA-ED]
skin - potential for cutaneous exposure
- Sweden: 10 ppm LLV; 50 mg/m3 LLV
15 ppm STV; 80 mg/m3 STV

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

*** Section 9 - Physical & Chemical Properties ***

Appearance:	Red or reddish/orange colored (dyed)	Odor:	Mild, petroleum distillate odor
Physical State:	Liquid	pH:	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	Vapor Density:	>1.0
Boiling Point:	340 to 700 °F (171 to 371 °C)	Melting Point:	ND
Solubility (H2O):	Negligible	Specific Gravity:	AP 0.823-0871
Evaporation Rate:	Slow; varies with conditions	VOC:	ND
Octanol/H2O Coeff.:	ND	Flash Point:	100 °F (38 °C) minimum
Flash Point Method:	PMCC	Upper Flammability Limit (UFL):	7.5
Lower Flammability Limit (LFL):	0.6	Burning Rate:	ND
Auto Ignition:	494°F (257°C)		

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers; Fluorel®

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

Harmful if swallowed.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

B: Component Analysis - LD50/LC50

Fuel oil No. 2 (68476-30-2)

Oral LD50 Rat 12 g/kg; Dermal LD50 Rabbit 4720 µL/kg; Dermal LD50 Rabbit >2000 mg/kg; Inhalation LC50 Rat 4.6 mg/L 4 h

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m³ 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Product Mixture

Oral LD50 Rat 14.5 ml/kg; Dermal LD50 Rabbit >5 mL/kg; Guinea Pig Sensitization: negative; Primary dermal irritation: moderately irritating (Draize mean irritation score - 3.98 rabbits); Draize eye irritation: mildly irritating (Draize score, 48 hours, unwashed - 2.0 rabbits)

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects. Material of similar composition has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Dermal carcinogenicity: positive - mice

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

This product is similar to Diesel Fuel. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A) and NIOSH regards it as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

B: Component Carcinogenicity

Fuel oil No. 2 (68476-30-2)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)

IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuel oil No. 2 (68476-30-2)

Test & Species

96 Hr LC50 Pimephales promelas

35 mg/L [flow-through]

Conditions

Naphthalene (91-20-3)

Test & Species

96 Hr LC50 Pimephales promelas

5.74-6.44 mg/L [flow-through]

Conditions

96 Hr LC50 Oncorhynchus mykiss

1.6 mg/L [flow-through]

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]
96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

IATA Information

Shipping Name: Heating oil, light

UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

ICAO Information

Shipping Name: Heating oil, light

UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

IMDG Information

Shipping Name: Heating oil, light

UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

*** Section 15 - Regulatory Information ***

Regulatory Information

Component Analysis – Inventory

Component/CAS	EC #	EEC	CAN	TSCA
Fuel oil No. 2 68476-30-2	270-671-4	EINECS	DSL	Yes
Naphthalene 91-20-3	202-049-5	EINECS	DSL	Yes

*** Section 16 - Other Information ***

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet



SAFETY DATA SHEET

SDS ID NO.: 0127MAR019
Revision Date: 06/01/2016

1. IDENTIFICATION

Product Name: Marathon Petroleum Gasoline - All Grades

Synonym: Gasoline; Regular Unleaded Gasoline; Conventional Regular Unleaded Gasoline; Mid Grade Unleaded Gasoline; Conventional Mid Grade Unleaded Gasoline; Premium Unleaded Gasoline; Conventional Premium Unleaded Gasoline; Sub-Octane Gasoline; Regular RBOB; Super RBOB; Premium RBOB; RBOB; Reformulated Blend Stock For Oxygenated Blending; 84 Octane Gasoline; CBOB; Premium CBOB; Conventional Blend Stock for Oxygenate Blending; Recreational Gasoline; Recreational Gasoline; Recreational Unleaded Gasoline; 89 Recreational Gasoline; Brand 89 Recreational Gasoline; 7.0 Max RVP 89 Recreational Gasoline; BR 7.0 Max RVP 89 Recreational Gasoline; 90 Recreational Gasoline; 90 Marina Gasoline; Brand 91 Recreational Gasoline; 91 Recreational Gasoline; 91 Marina Gasoline; 90 Octane Midgrade Gasoline with No Ethanol; 0125MAR019; 0126MAR019; 0134MAR019; 0313MAR019; 0314MAR019

Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.

Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:
MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Skin corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Aspiration toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)

Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

EXTREMELY FLAMMABLE LIQUID AND VAPOR

May accumulate electrostatic charge and ignite or explode

May be fatal if swallowed and enters airways

Causes skin irritation

May cause respiratory irritation

May cause drowsiness or dizziness

May cause genetic defects

May cause cancer

Suspected of damaging fertility or the unborn child

Toxic to aquatic life with long lasting effects



Appearance Clear yellow liquid

Physical State Liquid

Odor Hydrocarbon

Precautionary Statements - Prevention

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Keep away from heat/sparks/open flames/hot surfaces. - No smoking

Keep container tightly closed

Ground/bond container and receiving equipment

Use explosion-proof electrical/ventilating/lighting/equipment

Use only non-sparking tools.

Take precautionary measures against static discharge

Avoid breathing mist/vapors/spray

Use only outdoors or in a well-ventilated area

Wear protective gloves/protective clothing/eye protection/face protection

Wash hands and any possibly exposed skin thoroughly after handling

Avoid release to the environment

Precautionary Statements - Response

IF exposed or concerned: Get medical attention

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

If skin irritation occurs: Get medical attention

Wash contaminated clothing before reuse

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Call a POISON CENTER or doctor if you feel unwell

IF SWALLOWED: Immediately call a POISON CENTER or doctor

Do NOT induce vomiting

In case of fire: Use water spray, fog or regular foam for extinction

Collect spillage

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed

Keep cool

Store locked up

Precautionary Statements - Disposal

Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having molecular chains ranging in length from four to ten carbons. May contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Composition Information:

Name	CAS Number	% Concentration
Gasoline	86290-81-5	100
Heptane (mixed isomers)	142-82-5	2.5-26
Pentane (mixed isomers)	78-78-4	6.5-19
Butane (mixed isomers)	106-97-8	0.5-14
Hexane Isomers (other than n-Hexane)	107-83-5	2-12
Toluene	108-88-3	3-9.5
Xylene (mixed isomers)	1330-20-7	3.5-9.5
n-Hexane	110-54-3	0.1-4.5
Cumene	98-82-8	0-4
1,2,4 Trimethylbenzene	95-63-6	1-4
Ethylbenzene	100-41-4	0.5-2.5
Benzene	71-43-2	0.1-1.5
Cyclohexane	110-82-7	0-1.5
Octane	111-65-9	0-1.5
1,2,3-trimethylbenzene	526-73-8	0-1
Naphthalene	91-20-3	0.1-0.5

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES**First Aid Measures****General Advice:**

In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation:

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. If symptoms occur get medical attention.

Skin Contact:

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact:

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Indication of any immediate medical attention and special treatment needed

Notes To Physician:

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

For small fires, Class B fire extinguishing media such as CO₂, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media

Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical

This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.

Hazardous combustion products

Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data

Sensitivity to Mechanical Impact No.
Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters

Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Additional firefighting tactics

FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA Health 1 Flammability 3 Instability 0 Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.
Protective equipment:	Use personal protection measures as recommended in Section 8.
Emergency procedures:	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions:	Avoid release to the environment. Avoid subsoil penetration. Ethanol in gasoline phase separates in contact with water. Monitor downstream for dissolved ethanol or other appropriate indicators.
Methods and materials for containment:	Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
Methods and materials for cleaning up:	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions:

NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid contact with skin, eyes and clothing. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:

Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible Materials

Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELs:	OSHA - Vacated PELs	NIOSH IDLH
Gasoline 86290-81-5	300 ppm TWA 500 ppm STEL	-	300 ppm TWA 900 mg/m ³ TWA 500 ppm STEL 1500 mg/m ³ STEL	-

Heptane (mixed isomers) 142-82-5	400 ppm TWA 500 ppm STEL	TWA: 500 ppm TWA: 2000 mg/m ³	400 ppm TWA 1600 mg/m ³ TWA 500 ppm STEL 2000 mg/m ³ STEL	750 ppm
Pentane (mixed isomers) 78-78-4	1000 ppm TWA	-	-	-
Butane (mixed isomers) 106-97-8	1000 ppm STEL	-	800 ppm TWA 1900 mg/m ³ TWA	-
Hexane Isomers (other than n-Hexane) 107-83-5	500 ppm TWA 1000 ppm STEL	-	500 ppm TWA 1800 mg/m ³ TWA 1000 ppm STEL 3600 mg/m ³ STEL	-
Toluene 108-88-3	20 ppm TWA	TWA: 200 ppm Ceiling: 300 ppm	100 ppm TWA 375 mg/m ³ TWA 150 ppm STEL 560 mg/m ³ STEL	500 ppm
Xylene (mixed isomers) 1330-20-7	100 ppm TWA 150 ppm STEL	TWA: 100 ppm TWA: 435 mg/m ³	100 ppm TWA 435 mg/m ³ TWA 150 ppm STEL 655 mg/m ³ STEL	900 ppm
n-Hexane 110-54-3	50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 500 ppm TWA: 1800 mg/m ³	50 ppm TWA 180 mg/m ³ TWA	1100 ppm
Cumene 98-82-8	50 ppm TWA	TWA: 50 ppm TWA: 245 mg/m ³ Skin	50 ppm TWA 245 mg/m ³ TWA Limit applies to skin	900 ppm
1,2,4 Trimethylbenzene 95-63-6	25 ppm TWA	-	25 ppm TWA 125 mg/m ³ TWA	-
Ethylbenzene 100-41-4	20 ppm TWA	TWA: 100 ppm TWA: 435 mg/m ³	100 ppm TWA 435 mg/m ³ TWA 125 ppm STEL 545 mg/m ³ STEL	800 ppm
Benzene 71-43-2	0.5 ppm TWA 2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm (applies to industry segments exempt from the benzene standard) TWA: 1 ppm STEL: 5 ppm (see 29 CFR 1910.1028)	25 ppm Ceiling 1 ppm TWA 5 ppm STEL	500 ppm
Cyclohexane 110-82-7	100 ppm TWA	TWA: 300 ppm TWA: 1050 mg/m ³	300 ppm TWA 1050 mg/m ³ TWA	1300 ppm
Octane 111-65-9	300 ppm TWA	TWA: 500 ppm TWA: 2350 mg/m ³	300 ppm TWA 1450 mg/m ³ TWA 375 ppm STEL 1800 mg/m ³ STEL	1000 ppm
1,2,3-trimethylbenzene 526-73-8	25 ppm TWA	-	25 ppm TWA 125 mg/m ³ TWA	-
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m ³	10 ppm TWA 50 mg/m ³ TWA 15 ppm STEL 75 mg/m ³ STEL	250 ppm

Notes:

The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures:

Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection:	Use goggles or face-shield if the potential for splashing exists.
Skin and body protection:	Use nitrile rubber, Viton® or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.
Respiratory protection:	Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Clear yellow liquid
Color	Yellow
Odor	Hydrocarbon
Odor Threshold	No data available.

<u>Property</u>	<u>Values (Method)</u>
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	24-210 °C / 75-410 °F (ASTM D86)
Flash Point	-43 °C / -45 °F
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	7.6
Lower Flammability Limit:	1.4
Explosion limits:	No data available.
Vapor Pressure	5.5-15 psi (ASTM D4814)
Vapor Density	3-4
Specific Gravity / Relative Density	0.70-0.76
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	2.13-4.5
Decomposition temperature	No data available.
pH:	Not applicable
Autoignition Temperature	280 °C / 536 °F
Kinematic Viscosity	No data available.
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	100%
Density	No data available.
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

<u>Reactivity</u>	The product is non-reactive under normal conditions.
<u>Chemical stability</u>	The material is stable at 70°F, 760 mmHg pressure.
<u>Possibility of hazardous reactions</u>	None under normal processing.
<u>Hazardous polymerization</u>	Will not occur.

Conditions to avoid

Excessive heat, sources of ignition, open flame.

Incompatible Materials

Strong oxidizing agents.

Hazardous decomposition products

None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.
Eye contact	Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.
Skin contact	Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.
Ingestion	May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
Gasoline 86290-81-5	14000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h
Heptane (mixed isomers) 142-82-5	-	3000 mg/kg (Rabbit)	103 g/m ³ (Rat) 4 h
Pentane (mixed isomers) 78-78-4	-	-	450 mg/L (Mouse) 2 h
Butane (mixed isomers) 106-97-8	-	-	658 mg/L (Rat) 4 h
Hexane Isomers (other than n-Hexane) 107-83-5	> 5000 mg/kg (Rat)	-	-
Toluene 108-88-3	> 2000 mg/kg (Rat)	8390 mg/kg (Rabbit)	12.5 mg/L (Rat) 4 h
Xylene (mixed isomers) 1330-20-7	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.04 mg/L (Rat) 4 h
n-Hexane 110-54-3	15000 mg/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h
Cumene 98-82-8	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 20 mg/L (Rat) 6 h
1,2,4 Trimethylbenzene 95-63-6	3280 mg/kg (Rat)	> 3160 mg/kg (Rabbit)	18,000 mg/m ³ (Rat) 4 h
Ethylbenzene 100-41-4	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h
Benzene 71-43-2	> 2000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 20 mg/l (Rat) 4 h
Cyclohexane 110-82-7	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	13.9 mg/L (Rat) 4 h
Octane 111-65-9	-	-	118 g/m ³ (Rat) 4 h
1,2,3-trimethylbenzene 526-73-8	-	-	-
Naphthalene 91-20-3	490 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 340 mg/m ³ (Rat) 1 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

BUTANES: Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported

in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure with evidence of maternal toxicity. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

1,2,4-TRIMETHYLBENZENE: The following information pertains to a mixture of C9 aromatic hydrocarbons, over 40% of which was composed of 1,2,4-trimethylbenzene. A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm. Embryotoxicity has been reported in studies of laboratory animals. Adverse effects included increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate.<n><n>

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

CUMENE: Overexposure to cumene may cause upper respiratory tract irritation and CNS depression. Studies in laboratory animals indicate evidence of respiratory tract hyperplasia, and adverse effects on the liver, kidney and adrenal glands following high level exposure. The relevance of these findings to humans is not clear at this time. Findings from lifetime laboratory rodent inhalation studies were as follows: In F344/N rats: an increased incidence of renal carcinomas and adenomas, respiratory epithelial adenomas, and interstitial cell adenomas of the testes. In B6C3F1 mice: an increased incidence of carcinomas and adenomas of the bronchi and lung, liver neoplasms, hemangiosarcomas of the spleen, and adenomas of the thyroid.

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure with evidence of maternal toxicity. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss) following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

BENZENE: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute

Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a case control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included an increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC. The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of consciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

WHOLLY-VAPORIZED UNLEADED GASOLINE: Lifetime exposure to wholly vaporized unleaded gasoline produced an increased incidence of liver tumors in female mice exposed to the highest exposure concentration (2056 ppm) and α -2 urinary globulin-mediated kidney tumors in male rats. No exposure-related tumors were observed in male mice or female rats. The male-specific rat kidney tumors are not considered relevant to human health. Mice receiving lifetime repeated skin application of various petroleum naphthas exhibited an irritation-dependent increased incidence of skin tumors. Additional studies suggest that these tumors occur through a mechanism that may not be relevant to human health. Epidemiological data from over 18,000 petroleum marketing and distribution workers

showed no increased risk of leukemia, multiple myeloma, or kidney cancer resulting from gasoline exposure. Unleaded gasoline has been identified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs. Gasoline exhaust has been classified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms

Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Sensitization

Not expected to be a skin or respiratory sensitizer.

Mutagenic effects

May cause genetic defects.

Carcinogenicity

May cause cancer.

Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Heptane (mixed isomers) 142-82-5	Not Listed	Not Listed	Not Listed	Not Listed
Pentane (mixed isomers) 78-78-4	Not Listed	Not Listed	Not Listed	Not Listed
Butane (mixed isomers) 106-97-8	Not Listed	Not Listed	Not Listed	Not Listed
Hexane Isomers (other than n-Hexane) 107-83-5	Not Listed	Not Listed	Not Listed	Not Listed
Toluene 108-88-3	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
Xylene (mixed isomers) 1330-20-7	Not classifiable (A4)	Not classifiable (3)	Not Listed	Not Listed
n-Hexane 110-54-3	Not Listed	Not Listed	Not Listed	Not Listed
Cumene 98-82-8	Not listed	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not listed
1,2,4 Trimethylbenzene 95-63-6	Not Listed	Not Listed	Not Listed	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen
Cyclohexane 110-82-7	Not Listed	Not Listed	Not Listed	Not Listed
Octane 111-65-9	Not Listed	Not Listed	Not Listed	Not Listed
1,2,3-trimethylbenzene 526-73-8	Not Listed	Not Listed	Not Listed	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

Reproductive toxicity

Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Gasoline 86290-81-5	72-hr EC50 = 56 mg/l Algae	96-hr LC50 = 11 mg/l Rainbow trout (static)	-	48-hr LC50 = 7.6 mg/l Daphnia magna
Heptane (mixed isomers) 142-82-5	-	96-hr LC50 = 375 mg/L Tilapia	-	-
Pentane (mixed isomers) 78-78-4	-	96-hr LC50 = 3.1 mg/L Rainbow trout	-	48-hr EC50 = >1 - <10 mg/L Daphnia magna
Butane (mixed isomers) 106-97-8	-	-	-	-
Hexane Isomers (other than n-Hexane) 107-83-5	-	-	-	-
Toluene 108-88-3	72-hr EC50 = 12.5 mg/l Algae	96-hr LC50 ≤ 10 mg/l Rainbow trout	-	48-hr EC50 = 5.46-9.83 mg/l Daphnia magna 48-hr EC50 = 11.5 mg/l Daphnia magna (Static)
Xylene (mixed isomers) 1330-20-7	72-hr EC50 = 11 mg/l Algae	96-hr LC50 = 8 mg/l Rainbow trout	-	48-hr LC50 = 3.82 mg/l Daphnia magna
n-Hexane 110-54-3	-	96-hr LC50 = 2.5 mg/l Fathead minnow	-	-
Cumene 98-82-8	72-hr EC50 = 2.6 mg/l Algae	96-hr LC50 = 6.04-6.61 mg/l Fathead minnow (Flow-through) 96-hr LC50 = 2.7 mg/l Rainbow trout (semi-static)	-	48-hr EC50 = 7.9-14.1 mg/l Daphnia magna (static)
1,2,4 Trimethylbenzene 95-63-6	-	96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)	-	48-hr EC50 = 6.14 mg/L Daphnia magna
Ethylbenzene 100-41-4	72-hr EC50 = 1.7-7.6 mg/l Algae	96-hr LC50 = 4 mg/L Rainbow trout	-	48-hr EC50 = 1-4 mg/L Daphnia magna
Benzene 71-43-2	72-hr EC50 = 29 mg/l Algae	96-hr LC50 = 5.3 mg/l Rainbow trout (flow-through)	-	48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)
Cyclohexane 110-82-7	72-hr EC50 = 500 mg/l Algae	96-hr LC50 = 3.96-5.18 mg/l Fathead minnow	-	48-hr EC50 = 1.7-3.5 mg/L Bay shrimp
Octane 111-65-9	-	-	-	48-hr LC50 = 0.38 mg/l Daphnia magna
1,2,3-trimethylbenzene 526-73-8	-	96-hr LC50 = 7.72 mg/l Fathead Minnow (flow-through)	-	-
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/l Daphnia magna

Persistence and degradability Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues

This material may be a flammable liquid waste.

Safe Handling of Wastes

Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal

The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal

Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

TDG (Canada):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b):

This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Gasoline	NA
Heptane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Butane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	NA
Xylene (mixed isomers)	NA

n-Hexane	NA
Cumene	NA
1,2,4 Trimethylbenzene	NA
Ethylbenzene	NA
Benzene	NA
Cyclohexane	NA
Octane	NA
1,2,3-trimethylbenzene	NA
Naphthalene	NA

SARA Section 304:

This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Gasoline	NA
Heptane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Butane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	1000 lb final RQ 454 kg final RQ
Xylene (mixed isomers)	100 lb final RQ 45.4 kg final RQ
n-Hexane	5000 lb final RQ 2270 kg final RQ
Cumene	5000 lb final RQ 2270 kg final RQ
1,2,4 Trimethylbenzene	NA
Ethylbenzene	1000 lb final RQ 454 kg final RQ
Benzene	10 lb final RQ 4.54 kg final RQ
Cyclohexane	1000 lb final RQ 454 kg final RQ
Octane	NA
1,2,3-trimethylbenzene	NA
Naphthalene	100 lb final RQ 45.4 kg final RQ

SARA:

The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313:

This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Gasoline	None
Heptane (mixed isomers)	None
Pentane (mixed isomers)	None
Butane (mixed isomers)	None
Hexane Isomers (other than n-Hexane)	None
Toluene	1.0 % de minimis concentration
Xylene (mixed isomers)	1.0 % de minimis concentration
n-Hexane	1.0 % de minimis concentration
Cumene	1.0 % de minimis concentration

1,2,4 Trimethylbenzene	1.0 % de minimis concentration
Ethylbenzene	0.1 % de minimis concentration
Benzene	0.1 % de minimis concentration
Cyclohexane	1.0 % de minimis concentration
Octane	None
1,2,3-trimethylbenzene	None
Naphthalene	0.1 % de minimis concentration

State and Community Right-To-Know Regulations:

The following component(s) of this material are identified on the regulatory lists below:

Gasoline

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0957
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Heptane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1339
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Pentane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1064
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed

California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 1064 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Butane (mixed isomers)	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0273
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 0273 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Hexane Isomers (other than n-Hexane)	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1285
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Toluene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Developmental toxicity, initial date 1/1/91 Female reproductive toxicity, initial date 8/7/09
New Jersey Right-To-Know:	SN 1866
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed

New Jersey - Special Hazardous Substances:	Flammable - third degree; Teratogen
New Jersey - Environmental Hazardous Substances List:	SN 1866 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)
Xylene (mixed isomers)	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 2014
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold all isomers
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 2014 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)
n-Hexane	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1340
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1340 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1 lb RQ (air); 1 lb RQ (land/water)
Cumene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/6/10
New Jersey Right-To-Know:	SN 0542
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0542 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present

New York - Reporting of Releases Part 597 - List of Hazardous Substances:	5000 lb RQ (air); 1 lb RQ (land/water)
1,2,4 Trimethylbenzene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Ethylbenzene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 6/11/04
New Jersey Right-To-Know:	SN 0851
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; flammable - Third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)
Benzene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 2/27/87
	Developmental toxicity, initial date 12/26/97
	Male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know:	SN 0197
Pennsylvania Right-To-Know:	Environmental hazard; Special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Carcinogen; Extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Present
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree; Mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	10 lb RQ (air); 1 lb RQ (land/water)

Cyclohexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0565
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To-Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0565 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Octane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1434
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To-Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

1,2,3-trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To-Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	SN 1322 SN 3758

Pennsylvania Right-To-Know:	Environmental hazard Present (particulate)
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 1 lb RQ (land/water)

Canada DSL/NDL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Gasoline	B2,D2A,D2B	0.1%
Heptane (mixed isomers)	B2,D2B	1%
Pentane (mixed isomers)	B2	1%
Butane (mixed isomers)	A,B1	1%
Hexane Isomers (other than n-Hexane)	B2	1%
Toluene	B2,D2A,D2B	0.1%
Xylene (mixed isomers)	B2,D2A,D2B	m-, o-isomers 1.0%; p-isomer 0.1%
n-Hexane	B2,D2A,D2B	1%
Cumene	B2,D2A	0.1%
1,2,4 Trimethylbenzene	B3,D2B	1%
Ethylbenzene	B2,D2A,D2B	0.1%
Benzene	B2,D2A,D2B	0.1%
Cyclohexane	B2,D2B	1%
Octane	B2,D2B	1%
1,2,3-trimethylbenzene	B3	1%
Naphthalene	B4,D2A	0.1%



Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Date: 06/01/2016

Revision Note:

Revised Sections

The following sections (§) have been updated:

1. IDENTIFICATION
2. HAZARD IDENTIFICATION
3. COMPOSITION/INFORMATION ON INGREDIENTS
4. FIRST AID MEASURES
6. ACCIDENTAL RELEASE MEASURES
7. HANDLING AND STORAGE
8. EXPOSURE CONTROLS/PERSONAL PROTECTION
9. PHYSICAL AND CHEMICAL PROPERTIES
11. TOXICOLOGICAL INFORMATION
12. ECOLOGICAL INFORMATION
15. REGULATORY INFORMATION

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Helium

Section 1. Identification

GHS product identifier	: Helium
Chemical name	: Helium
Other means of identification	: helium (dot); Helium-4; He; o-Helium; UN 1046
Product use	: Synthetic/Analytical chemistry.
Synonym	: helium (dot); Helium-4; He; o-Helium; UN 1046
SDS #	: 001025
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Emergency telephone number (with hours of operation)	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms



Signal word

: Warning

Hazard statements

: Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General

: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention

: Use and store only outdoors or in a well ventilated place.

Response

: Not applicable.

Storage

: Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal

: Not applicable.

Hazards not otherwise classified

: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance
Chemical name : Helium
Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

CAS number/other identifiers

CAS number : 7440-59-7
Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Frostbite : Try to warm up the frozen tissues and seek medical attention.
Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Section 4. First aid measures

- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Hazardous thermal decomposition products** : No specific data.

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Gas. [Compressed gas.]
- Color** : Colorless.
- Molecular weight** : 4 g/mole
- Molecular formula** : He
- Boiling/condensation point** : -268.9°C (-452°F)
- Melting/freezing point** : -272.2°C (-458°F)
- Critical temperature** : -267.9°C (-450.2°F)
- Odor** : Odorless.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : [Product does not sustain combustion.]
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft³ (125 kg/m³)
- Specific Volume (ft³/lb)** : 96.1538
- Gas Density (lb/ft³)** : 0.0104
- Relative density** : Not applicable.
- Solubility** : Not available.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : 0.28
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.

Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Helium	0.28	-	low

Mobility in soil






Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	Limited quantity Yes. Packaging instruction Passenger aircraft Quantity limitation: 75 kg Cargo aircraft Quantity limitation: 150 kg	Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75	-	-	Passenger and Cargo Aircraft Quantity limitation: 75 kg Cargo Aircraft Only Quantity limitation: 150 kg

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

Section 15. Regulatory information

International lists

- Australia inventory (AICS):** This material is listed or exempted.
- China inventory (IECSC):** This material is listed or exempted.
- Japan inventory:** Not determined.
- Korea inventory:** This material is listed or exempted.
- Malaysia Inventory (EHS Register):** Not determined.
- New Zealand Inventory of Chemicals (NZIoC):** This material is listed or exempted.
- Philippines inventory (PICCS):** This material is listed or exempted.
- Taiwan inventory (CSNN):** Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: This material is not listed.

Canadian ARET: This material is not listed.

Canadian NPRI: This material is not listed.

Alberta Designated Substances: This material is not listed.

Ontario Designated Substances: This material is not listed.

Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 10/15/2014.

Date of issue/Date of revision : 10/15/2014.

Date of previous issue : 10/2/2014.

Version : 0.02

Key to abbreviations :

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- UN = United Nations
- ACGIH – American Conference of Governmental Industrial Hygienists
- AIHA – American Industrial Hygiene Association
- CAS – Chemical Abstract Services
- CEPA – Canadian Environmental Protection Act
- CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
- CFR – United States Code of Federal Regulations
- CPR – Controlled Products Regulations
- DSL – Domestic Substances List
- GWP – Global Warming Potential
- IARC – International Agency for Research on Cancer
- ICAO – International Civil Aviation Organisation
- Inh – Inhalation
- LC – Lethal concentration
- LD – Lethal dosage
- NDSL – Non-Domestic Substances List
- NIOSH – National Institute for Occupational Safety and Health
- TDG – Canadian Transportation of Dangerous Goods Act and Regulations
- TLV – Threshold Limit Value
- TSCA – Toxic Substances Control Act
- WEEL – Workplace Environmental Exposure Level
- WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Version 5.3
Revision Date 04/24/2015
Print Date 04/02/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Heptachlor epoxide

Product Number : 49042
Brand : Supelco
Index-No. : 602-063-00-5

CAS-No. : 1024-57-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 2), H300
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H300 Fatal if swallowed.
H351 Suspected of causing cancer.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: Heptachlor exo-epoxide HCE exo-1,4,5,6,7,8,8-Heptachloro-2,3-epoxy-4,7-methano-3a,4,7,7a-tetrahydroindane
Formula	: C ₁₀ H ₅ Cl ₇ O
Molecular weight	: 389.32 g/mol
CAS-No.	: 1024-57-3
EC-No.	: 213-831-0
Index-No.	: 602-063-00-5

Hazardous components

Component	Classification	Concentration
Heptachlor epoxide		
	Acute Tox. 2; Carc. 2; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H300, H351, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Heptachlor epoxide	1024-57-3	TWA	0.05 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|-------------------------------------|
| a) Appearance | Form: solid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | 157.0 - 161.0 °C (314.6 - 321.8 °F) |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |

- | | | |
|----|--|-------------------|
| i) | Flammability (solid, gas) | No data available |
| j) | Upper/lower flammability or explosive limits | No data available |
| k) | Vapour pressure | No data available |
| l) | Vapour density | No data available |
| m) | Relative density | No data available |
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | log Pow: 5.40 |
| p) | Auto-ignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

9.2 Other safety information

Bulk density	1,100 kg/m3
--------------	-------------

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 15.0 mg/kg

Inhalation: No data available

Dermal: No data available

LD50 Intracerebral - Mouse - 8 mg/kg

Remarks: Behavioral: Convulsions or effect on seizure threshold.

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Heptachlor epoxide)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: PB9450000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood -

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - *Oncorhynchus mykiss* (rainbow trout) - 0.02 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates LC50 - *Daphnia magna* (Water flea) - 0.24 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 32 d
- 0.0013 mg/l

Bioconcentration factor (BCF): 14,400

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solids, organic, n.o.s. (Heptachlor epoxide)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Heptachlor epoxide)

IATA

UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, organic, n.o.s. (Heptachlor epoxide)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Heptachlor epoxide	1024-57-3	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptachlor epoxide	1024-57-3	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptachlor epoxide	1024-57-3	1994-04-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.
Heptachlor epoxide

CAS-No.	Revision Date
1024-57-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H300	Fatal if swallowed.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3

Revision Date: 04/24/2015

Print Date: 04/02/2016

Safety data for indeno[1,2,3-cd]pyrene

[Glossary](#) of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,10-(1,2-phenylene)pyrene, 1,10-(o-phenylene)pyrene, o-phenylenepyrene, 2,3-phenylenepyrene, 2,3,o-phenylenepyrene, IP
Use:

Molecular formula: C₂₂H₁₂

CAS No: 193-39-5

EINECS No: 205-893-2

Physical data

Appearance: solid

Melting point: 161 - 163 C

Boiling point: 536 C

Vapour density:

Vapour pressure:

Density (g cm⁻³):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Incompatible with strong oxidizing agents.

Toxicology

Limited evidence that this material may be carcinogenic.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given [here](#).)

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here.](#))
R40.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here.](#))
Non-hazardous for air, sea and road freight.

Personal protection

Treat as potentially hazardous - many multi-ring aromatic compounds are suspected carcinogens.

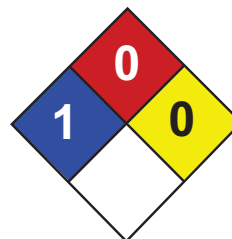
Safety phrases

(The meaning of any safety phrases which appear in this section is given [here.](#))
S36 S37 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on May 10, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://msds.chem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg/m³) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m³) from OSHA (PEL) [United States] TWA: 0.03 (mg/m³) from NIOSH [United States] TWA: 0.05 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:21 PM

Last Updated: 11/06/2008 12:00 PM

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SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Manganese

Product Number : 463728
Brand : Aldrich

CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H260

In contact with water releases flammable gases which may ignite spontaneously.

H412

Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P223

Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232

Handle under inert gas. Protect from moisture.

P273

Avoid release to the environment.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

P335 + P334

Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.

P370 + P378

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

P402 + P404
P501

Store in a dry place. Store in a closed container.

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Mn
Molecular weight : 54.94 g/mol
CAS-No. : 7439-96-5
EC-No. : 231-105-1

Hazardous components

Component	Classification	Concentration
Manganese		
	Water-react. 1; Aquatic Acute 3; Aquatic Chronic 3; H260, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder Carbon dioxide (CO₂)

Unsuitable extinguishing media

Water

5.2 Special hazards arising from the substance or mixture

Manganese/manganese oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Manganese	7439-96-5	TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC)		
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		

		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) varies		
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

impervious clothing, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: powder Colour: grey
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 1,244 °C (2,271 °F) - lit.
f) Initial boiling point and boiling range	1,962 °C (3,564 °F) - lit.
g) Flash point	Not applicable
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	7.3 g/mL at 25 °C (77 °F)
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 9,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Carcinogenicity - Rat - Intramuscular

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic: Tumors at site of application.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: OO9275000

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)

Poison Inhalation Hazard: No

IMDG

UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

IATA

UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
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SARA 311/312 Hazards

Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
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Pennsylvania Right To Know Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
-----------	----------------------	-----------------------------

New Jersey Right To Know Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
-----------	----------------------	-----------------------------

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H260	In contact with water releases flammable gases which may ignite spontaneously.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	2

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6

Revision Date: 03/02/2015

Print Date: 02/07/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Manganese

Product Number : 463728
Brand : Aldrich

CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260

Acute aquatic toxicity (Category 3), H402

Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H260

In contact with water releases flammable gases which may ignite spontaneously.

H412

Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P223

Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232

Handle under inert gas. Protect from moisture.

P273

Avoid release to the environment.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

P335 + P334

Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.

P370 + P378

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

P402 + P404
P501

Store in a dry place. Store in a closed container.

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Mn
Molecular weight : 54.94 g/mol
CAS-No. : 7439-96-5
EC-No. : 231-105-1

Hazardous components

Component	Classification	Concentration
Manganese		
	Water-react. 1; Aquatic Acute 3; Aquatic Chronic 3; H260, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder Carbon dioxide (CO₂)

Unsuitable extinguishing media

Water

5.2 Special hazards arising from the substance or mixture

Manganese/manganese oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Manganese	7439-96-5	TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC)		
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		

		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) varies		
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

impervious clothing, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|---|
| a) Appearance | Form: powder
Colour: grey |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 1,244 °C (2,271 °F) - lit. |
| f) Initial boiling point and boiling range | 1,962 °C (3,564 °F) - lit. |
| g) Flash point | Not applicable |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 7.3 g/mL at 25 °C (77 °F) |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | No data available |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 9,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Carcinogenicity - Rat - Intramuscular

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic: Tumors at site of application.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: OO9275000

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)

Poison Inhalation Hazard: No

IMDG

UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

IATA

UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
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SARA 311/312 Hazards

Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
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Pennsylvania Right To Know Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
-----------	----------------------	-----------------------------

New Jersey Right To Know Components

Manganese	CAS-No. 7439-96-5	Revision Date 2007-07-01
-----------	----------------------	-----------------------------

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H260	In contact with water releases flammable gases which may ignite spontaneously.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	2

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6

Revision Date: 03/02/2015

Print Date: 02/07/2016

ERROR: undefined
OFFENDING COMMAND: get

STACK:

/quit
-dictionary-
-mark-



Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 27-Jan-2010

Revision Date 02-Oct-2015

Revision Number 2

1. Identification

Product Name Methylene chloride

Cat No. : D37-1; D37-4; D37-20; D37-200; D37-200LC; D37-500; D37FB-19; D37FB-50; D37FB-115; D37FB-200; D37POP-19; D37POPB-50; D37POPB-200; D37RB-19; D37RB-50; D37RB-115; D37RB-200; D37RS-19; D37RS-28; D37RS-50; D37RS-115; D37RS-200; D37SK-4; D37SK-4LC; D37SS-28; D37SS-50; D37SS-115; D37SS-200; D37SS-1350

Synonyms Dichloromethane; DCM

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS), Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver, Kidney, Blood.	

Label Elements

Signal Word

Danger

Hazard Statements

Causes skin irritation
Causes serious eye irritation

May cause respiratory irritation
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

WARNING! This product contains a chemical known in the State of California to cause cancer, birth defects or other reproductive harm.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Methylene chloride	75-09-2	>99.5
Methyl alcohol	67-56-1	0 - 0.4
Cyclohexene	110-83-8	0 - 0.01
2-Methyl-2-butene	513-35-9	0 - 0.01

4. First-aid measures

General Advice

If symptoms persist, call a physician.

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.
Ingestion	Do not induce vomiting. Call a physician or Poison Control Center immediately.
Most important symptoms/effects	Breathing difficulties. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	556 °C / 1032.8 °F
Explosion Limits	
Upper	23 vol %
Lower	13 vol %
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO₂) Hydrogen chloride gas Phosgene

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
2

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Keep people away from and upwind of spill/leak.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Use only under a chemical fume hood.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Methylene chloride	TWA: 50 ppm	(Vacated) TWA: 500 ppm (Vacated) STEL: 2000 ppm (Vacated) Ceiling: 1000 ppm TWA: 25 ppm STEL: 125 ppm	IDLH: 2300 ppm
Methyl alcohol	TWA: 200 ppm STEL: 250 ppm Skin	(Vacated) TWA: 200 ppm (Vacated) TWA: 260 mg/m ³ (Vacated) STEL: 250 ppm (Vacated) STEL: 325 mg/m ³ Skin TWA: 200 ppm TWA: 260 mg/m ³	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m ³ STEL: 250 ppm STEL: 325 mg/m ³
Cyclohexene	TWA: 300 ppm	(Vacated) TWA: 300 ppm (Vacated) TWA: 1015 mg/m ³ TWA: 300 ppm TWA: 1015 mg/m ³	IDLH: 2000 ppm TWA: 300 ppm TWA: 1015 mg/m ³

Component	Quebec	Mexico OEL (TWA)	Ontario TWA/EV
Methylene chloride	TWA: 50 ppm TWA: 174 mg/m ³	TWA: 100 ppm TWA: 330 mg/m ³ STEL: 500 ppm STEL: 1740 mg/m ³	TWA: 50 ppm
Methyl alcohol	TWA: 200 ppm TWA: 262 mg/m ³ STEL: 250 ppm STEL: 328 mg/m ³ Skin	TWA: 200 ppm TWA: 260 mg/m ³ STEL: 250 ppm STEL: 310 mg/m ³	TWA: 200 ppm STEL: 250 ppm Skin
Cyclohexene	TWA: 300 ppm TWA: 1010 mg/m ³	TWA: 300 ppm TWA: 1015 mg/m ³	TWA: 300 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment**Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State

Liquid

Appearance

Colorless

Odor

sweet

Odor Threshold

No information available

pH

Not applicable

Melting Point/Range

-97 °C / -142.6 °F

Boiling Point/Range

39 °C / 102.2 °F

Flash Point

No information available

Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	23 vol %
Lower	13 vol %
Vapor Pressure	20 mmHg @ 3502°C
Vapor Density	2.93 (Air = 1.0)
Specific Gravity	1.33
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	556 °C / 1032.8 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C H ₂ Cl ₂
Molecular Weight	84.93

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat.
Incompatible Materials	Strong oxidizing agents, Strong acids, Amines
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂), Hydrogen chloride gas, Phosgene
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methylene chloride	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rat)	53 mg/L (Rat) 6 h 76000 mg/m ³ (Rat) 4 h
Methyl alcohol	LD50 = 6200 mg/kg (Rat)	LD50 = 15800 mg/kg (Rabbit)	64000 ppm (Rat) 4 h 83.2 mg/L (Rat) 4 h
Cyclohexene	LD50 = 2400 µL/kg (Rat)	>200 mg/kg (Rat)	>21.6 mg/L/4h (rat)
2-Methyl-2-butene	700-2600 mg/kg (Rat)	>2000 mg/kg (Rat)	LC50 > 61000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Irritating to eyes and skin
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Methylene chloride	75-09-2	Group 2A	Reasonably Anticipated	A3	X	A3
Methyl alcohol	67-56-1	Not listed	Not listed	Not listed	Not listed	Not listed

Cyclohexene	110-83-8	Not listed	Not listed	Not listed	Not listed	Not listed
2-Methyl-2-butene	513-35-9	Not listed	Not listed	Not listed	Not listed	Not listed

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens

A1 - Confirmed Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Confirmed Animal Carcinogen

A4 - Not Classifiable as a Human Carcinogen

A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects

Mutagenic effects have occurred in microorganisms.

Reproductive Effects

Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects

Developmental effects have occurred in experimental animals.

Teratogenicity

No information available.

STOT - single exposure

Central nervous system (CNS) Respiratory system

STOT - repeated exposure

Liver Kidney Blood

Aspiration hazard

No information available

Symptoms / effects, both acute and delayed

Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information

No information available

Other Adverse Effects

Tumorigenic effects have been reported in experimental animals. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methylene chloride	EC50: >660 mg/L/96h	Pimephales promelas: LC50: 193 mg/L/96h	EC50: 1 mg/L/24 h EC50: 2.88 mg/L/15 min	EC50: 140 mg/L/48h
Methyl alcohol	Not listed	Pimephales promelas: LC50 > 10000 mg/L 96h	EC50 = 39000 mg/L 25 min EC50 = 40000 mg/L 15 min EC50 = 43000 mg/L 5 min	EC50 > 10000 mg/L 24h
Cyclohexene	Not listed	Poecillia reticulata: 7.1 mg/L/96h	Not listed	Daphnia: EC50: 5.3 mg/L/48h
2-Methyl-2-butene	Not listed	Not listed	Not listed	EC50: = 3 mg/L, 48h (Daphnia magna)

**Persistence and Degradability
Bioaccumulation/ Accumulation**

Persistence is unlikely based on information available.

No information available.

Mobility

Will likely be mobile in the environment due to its volatility.

Component	log Pow
Methylene chloride	1.25
Methyl alcohol	-0.74

Cyclohexene	3.27
-------------	------

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methylene chloride - 75-09-2	U080	-
Methyl alcohol - 67-56-1	U154	-

14. Transport information

DOT

UN-No UN1593
 Proper Shipping Name DICHLOROMETHANE
 Hazard Class 6.1
 Packing Group III

TDG

UN-No UN1593
 Proper Shipping Name DICHLOROMETHANE
 Hazard Class 6.1
 Packing Group III

IATA

UN-No UN1593
 Proper Shipping Name Dichloromethane
 Hazard Class 6.1
 Packing Group III

IMDG/IMO

UN-No UN1593
 Proper Shipping Name Dichloromethane
 Hazard Class 6.1
 Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Methylene chloride	X	X	-	200-838-9	-		X	X	X	X	X
Methyl alcohol	X	X	-	200-659-6	-		X	X	X	X	X
Cyclohexene	X	X	-	203-807-8	-		X	X	X	X	X
2-Methyl-2-butene	X	X	-	208-156-3	-		X	X	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Methylene chloride	75-09-2	>99.5	0.1
Methyl alcohol	67-56-1	0 - 0.4	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Methylene chloride	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Methylene chloride	X		-
Methyl alcohol	X		-

OSHA Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Methylene chloride	125 ppm STEL 12.5 ppm Action Level 25 ppm TWA	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methylene chloride	1000 lb 1 lb	-
Methyl alcohol	5000 lb	-

California Proposition 65

This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Methylene chloride	75-09-2	Carcinogen	200 µg/day 50 µg/day	Carcinogen
Methyl alcohol	67-56-1	Developmental	-	Developmental

U.S. State Right-to-Know

Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methylene chloride	X	X	X	X	X
Methyl alcohol	X	X	X	X	X
Cyclohexene	X	X	X	-	X
2-Methyl-2-butene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials
D2A Very toxic materials

**16. Other information**

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 27-Jan-2010

Revision Date 02-Oct-2015

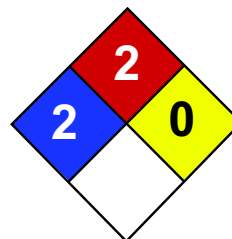
Print Date 02-Oct-2015

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



Health	2
Fire	2
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Naphthalene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Naphthalene

Catalog Codes: SLN1789, SLN2401

CAS#: 91-20-3

RTECS: QJ0525000

TSCA: TSCA 8(b) inventory: Naphthalene

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C₁₀H₈

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Naphthalene	91-20-3	100

Toxicological Data on Ingredients: Naphthalene: ORAL (LD50): Acute: 490 mg/kg [Rat]. 533 mg/kg [Mouse]. 1200 mg/kg [Guinea pig]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit]. VAPOR (LC50): Acute: 170 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant, permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 567°C (1052.6°F)

Flash Points: CLOSED CUP: 88°C (190.4°F). OPEN CUP: 79°C (174.2°F).

Flammable Limits: LOWER: 0.9% UPPER: 5.9%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Israel: TWA: 10 (ppm) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [1995] TWA: 52 STEL: 79 (mg/m³) from ACGIH [1995]
Australia: STEL: 15 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline solid.)

Odor: Aromatic.

Taste: Not available.

Molecular Weight: 128.19 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 218°C (424.4°F)

Melting Point: 80.2°C (176.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.162 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 4.4 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.038 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:

Partially dispersed in hot water, methanol, n-octanol. Very slightly dispersed in cold water. See solubility in methanol, n-octanol.

Solubility:

Partially soluble in methanol, n-octanol. Very slightly soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: May attack some forms of rubber and plastic

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 490 mg/kg [Rat]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 170 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 305.2 ppm 96 hour(s) [Trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Naphthalene, refined : UN1334 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Naphthalene Pennsylvania RTK: Naphthalene Florida: Naphthalene Minnesota: Naphthalene Massachusetts RTK: Naphthalene TSCA 8(b) inventory: Naphthalene TSCA 8(a) PAIR: Naphthalene TSCA 8(d) H and S data reporting: Naphthalene: 06/01/87 SARA 313 toxic chemical notification and release reporting: Naphthalene: 1% CERCLA: Hazardous substances.: Naphthalene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-4: Flammable solid. CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R36- Irritating to eyes. R40- Possible risks of irreversible effects. R48/22- Harmful: danger of serious damage to health by prolonged exposure if swallowed. R48/23- Toxic: danger of serious damage to health by prolonged exposure through inhalation. R63- Possible risk of harm to the unborn child.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 2

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 01:30 PM

Last Updated: 11/06/2008 12:00 PM

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SAFETY DATA SHEET

Creation Date 04-Oct-2010

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name Nickel, powder

Cat No. : AC193610000; AC193610250; AC193611000; AC193615000

Synonyms Raney alloy

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Sensitization	Category 1
Carcinogenicity	Category 2
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements

May cause an allergic skin reaction
Causes damage to organs through prolonged or repeated exposure
Suspected of causing cancer



Precautionary Statements

Prevention

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Contaminated work clothing should not be allowed out of the workplace

Response

IF exposed or concerned: Get medical attention/advice

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse

Storage

Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Harmful to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Nickel powder	7440-02-0	>95

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.
Ingestion	Do not induce vomiting. Call a physician or Poison Control Center immediately.
Most important symptoms/effects	May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	400 °C / 752 °F
Explosion Limits	
Upper	No data available
Lower	No data available

Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Combustible material.

Hazardous Combustion Products

Nickel oxides.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
3

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions

Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Avoid dust formation.

Environmental Precautions

Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up

Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling

Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Do not breathe vapors/dust. Do not ingest.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Nickel powder	TWA: 1.5 mg/m ³	(Vacated) TWA: 1 mg/m ³ TWA: 1 mg/m ³	IDLH: 10 mg/m ³ TWA: 0.015 mg/m ³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Nickel powder	TWA: 1 mg/m ³	TWA: 1 mg/m ³	TWA: 1 mg/m ³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Brown
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	1455 °C / 2651 °F
Boiling Point/Range	2730 °C / 4946 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 1810 °C
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	400 °C / 752 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Ni
Molecular Weight	58.7

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Avoid dust formation.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Nickel oxides
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity**Component Information**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Nickel powder	9000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization May cause sensitization by skin contact Nickel and nickel compounds may cause a form of dermatitis known as nickel itch. May cause an allergic skin reaction

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Nickel powder	7440-02-0	Group 2B	Reasonably Anticipated	Not listed	X	Not listed

IARC: (International Agency for Research on Cancer)

Group 2B - Possibly Carcinogenic to Humans

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure Kidney Blood

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Do not empty into drains. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nickel powder	0.18 mg/L EC50 = 72 h 0.174 - 0.311 mg/L EC50 96 h	10.4 mg/L LC50 96 h 1.3 mg/L LC50 96 h 100 mg/L LC50 96 h	Not listed	1 mg/L EC50 = 48 h 100 mg/L EC50 > 48 h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3089
 Proper Shipping Name METAL POWDERS, FLAMMABLE, N.O.S.
 Hazard Class 4.1
 Packing Group II

TDG

UN-No UN3089
 Proper Shipping Name METAL POWDERS, FLAMMABLE, N.O.S.
 Hazard Class 4.1
 Packing Group II

IATA

UN-No 3089
 Proper Shipping Name METAL POWDERS, FLAMMABLE, N.O.S.
 Hazard Class 4.1
 Packing Group II

IMDG/IMO

UN-No 3089
 Proper Shipping Name METAL POWDERS, FLAMMABLE, N.O.S.
 Hazard Class 4.1
 Packing Group II

15. Regulatory information**International Inventories**

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Nickel powder	X	X	-	231-111-4	-		X	-	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nickel powder	7440-02-0	>95	0.1

SARA 311/312 Hazardous Categorization

Acute Health Hazard Yes
 Chronic Health Hazard Yes
 Fire Hazard No
 Sudden Release of Pressure Hazard No
 Reactive Hazard No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nickel powder	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Nickel powder	X		-

OSHA Occupational Safety and Health Administration
 Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive

Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nickel powder	100 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals:

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Nickel powder	7440-02-0	Carcinogen	-	Carcinogen

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Nickel powder	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2A Very toxic materials



16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 04-Oct-2010

Revision Date 10-Feb-2015

Print Date 10-Feb-2015

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



SAFETY DATA SHEET

Creation Date 01-May-2012

Revision Date 11-Aug-2014

Revision Number 1

1. Identification

Product Name Phenanthrene

Cat No. : AC130090000; AC130090050; AC130090500; AC130095000

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity

Category 4

Label Elements

Signal Word

Warning

Hazard Statements

Harmful if swallowed



Precautionary Statements

Prevention

Wash face, hands and any exposed skin thoroughly after handling

Do not eat, drink or smoke when using this product

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Phenanthrene	85-01-8	>95

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
Skin Contact	Obtain medical attention. Wash off immediately with plenty of water for at least 15 minutes.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.
Most important symptoms/effects	None reasonably foreseeable.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	Not applicable
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion ProductsCarbon monoxide (CO) Carbon dioxide (CO₂)**Protective Equipment and Precautions for Firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPAHealth
1Flammability
1Instability
0Physical hazards
N/A**6. Accidental release measures**

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.
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Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	95 - 101 °C / 203 - 213.8 °F
Boiling Point/Range	336 °C / 636.8 °F
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 116 °C
Vapor Density	Not applicable
Relative Density	1.063
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition temperature	No information available
Viscosity	Not applicable
Molecular Formula	C14 H10
Molecular Weight	178.23

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Avoid dust formation.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Phenanthrene	1.8 g/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Phenanthrene	85-01-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
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Phenanthrene	Not listed	LC50 = 3.2 mg/L 96h	Not listed	LC50 = 0.35 mg/L 48h
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Persistence and Degradability Insoluble in water May persist

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Phenanthrene	4.46

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
 Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
 Hazard Class 9
 Packing Group III

TDG

UN-No UN3077
 Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
 Hazard Class 9
 Packing Group III

IATA

UN-No UN3077
 Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
 Hazard Class 9
 Packing Group III

IMDG/IMO

UN-No UN3077
 Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
 Hazard Class 9
 Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Phenanthrene	X	X	-	201-581-5	-		X	X	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Phenanthrene	85-01-8	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Phenanthrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Phenanthrene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Phenanthrene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
 DOT Marine Pollutant N
 DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By Regulatory Affairs

Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-May-2012

Revision Date 11-Aug-2014

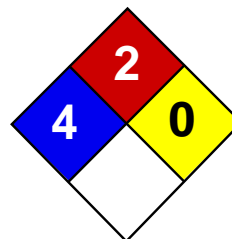
Print Date 11-Aug-2014

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



Health	3
Fire	2
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Phenol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Phenol

Catalog Codes: SLP4453, SLP5251

CAS#: 108-95-2

RTECS: SJ3325000

TSCA: TSCA 8(b) inventory: Phenol

CI#: Not available.

Synonym: Monohydroxybenzene; Benzenol; Phenyl hydroxide; Phenyllic acid

Chemical Name: Carbohic Acid

Chemical Formula: C₆H₅OH

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Phenol	108-95-2	100

Toxicological Data on Ingredients: Phenol: ORAL (LD50): Acute: 317 mg/kg [Rat]. 270 mg/kg [Mouse]. DERMAL (LD50): Acute: 630 mg/kg [Rabbit]. 669 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (sensitizer, permeator). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated

exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 715°C (1319°F)

Flash Points: CLOSED CUP: 79°C (174.2°F). OPEN CUP: 85°C (185°F).

Flammable Limits: LOWER: 1.7% UPPER: 8.6%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Phenol + nitrides results in heat and flammable gas generation. Phenol + mineral oxidizing acids results in fire. Phenol + calcium hypochlorite is an exothermic reaction producing toxic fumes which may ignite.

Special Remarks on Explosion Hazards:

Phenol + sodium nitrite causes explosion on heating. Peroxydisulfuric acid + phenol causes explosion.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Air Sensitive. Sensitive to light. Store in light-resistant containers. Moisture sensitive. Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 5 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 19 (mg/m3) from ACGIH (TLV) [United States] SKIN TWA: 5 from NIOSH [United States] TWA: 19 (mg/m3) from NIOSH [United States] TWA: 5 (ppm) from OSHA (PEL) [United States] TWA: 19 (mg/m3) from OSHA (PEL) [United States] TWA: 5 (ppm) [Canada] TWA: 19 (mg/m3) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor:

Distinct, aromatic, somewhat sickening sweet and acrid

Taste: Burning.

Molecular Weight: 94.11 g/mole

Color: Colorless to light pink

pH (1% soln/water): Not available.

Boiling Point: 182°C (359.6°F)

Melting Point: 42°C (107.6°F)

Critical Temperature: 694.2 (1281.6°F)

Specific Gravity: 1.057 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 3.24 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.048 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 1.5$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:

Easily soluble in methanol, diethyl ether. Soluble in cold water, acetone. Solubility in water: 1g/15 ml water. Soluble in benzene. Very soluble in alcohol, chloroform, glycerol, petroleum, carbon disulfide, volatile and fixed oils, aqueous alkali hydroxides, carbon tetrachloride, acetic acid, liquid sulfur dioxide. Almost insoluble in petroleum ether. Miscible in acetone. Sparingly soluble in mineral oil.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks), light, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity:

Extremely corrosive in presence of copper. Slightly corrosive in presence of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass, of aluminum.

Special Remarks on Reactivity:

Air and light sensitive. Prone to redden on exposure to light and air. Incompatible with aluminum chloride, peroxydisulfuirc acid, acetaldehyde, sodium nitrite, boron trifluoride diethyl ether + 1,3-butadiene, isocyanates, nitrides, mineral oxidizing acids, calcium hypochlorite, halogens, formaldehyde, metals and alloys, lead, zinc, magnesium and their alloys, plastics, rubber, coatings, sodium nitrate + trifluoroacetic acid. Phenol + isocyanates results in heat generation, and violent polymerization. Phenol + 1,3-butadiene and boron trifluoride diethyl ether complex results in intense exothermic reaction. Phenol + acetaldehyde results in violent condensation.

Special Remarks on Corrosivity:

Minor corrosive effect on bronze. Severe corrosive effect on brass.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

Acute oral toxicity (LD50): 270 mg/kg [Mouse]. Acute dermal toxicity (LD50): 630 mg/kg [Rabbit].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant), of ingestion, . Hazardous in case of skin contact (sensitizer, permeator), of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 140 mg/kg LDL [Infant] - Route: Oral; Dose: 10,000 mg/kg

Special Remarks on Chronic Effects on Humans:

Animal: passes through the placental barrier. May cause adverse reproductive effects and birth defects (teratogenic) Embryotoxic and/or foetotoxic in animal. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:**Section 12: Ecological Information****Ecotoxicity:**

Ecotoxicity in water (LC50): 125 mg/l 24 hours [Fish (Goldfish)]. >50 mg/l 1 hours [Fish (Fathead minnow)]. >50 mg/l 24 hours [Fish (Fathead minnow)]. >33 mg/l 72 hours [Fish (Fathead minnow)]. >33 ppm 96 hours [Fish (Fathead minnow)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Phenol, solid UNNA: 1671 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information**Federal and State Regulations:**

Connecticut hazardous material survey.: Phenol Illinois toxic substances disclosure to employee act: Phenol Illinois chemical safety act: Phenol New York release reporting list: Phenol Rhode Island RTK hazardous substances: Phenol Pennsylvania RTK: Phenol Minnesota: Phenol Massachusetts RTK: Phenol Massachusetts spill list: Phenol New Jersey: Phenol New Jersey spill list: Phenol Louisiana RTK reporting list: Phenol Louisiana spill reporting: Phenol TSCA 8(b) inventory: Phenol TSCA 4(a) proposed test rules: Phenol TSCA 8(a) IUR: Phenol TSCA 8(d) H and S data reporting: Phenol: effective: 6/1/87; sunset:

6/01/97 SARA 302/304/311/312 extremely hazardous substances: Phenol SARA 313 toxic chemical notification and release reporting: Phenol CERCLA: Hazardous substances.: Phenol: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive solid.

DSCL (EEC):

R24/25- Toxic in contact with skin and if swallowed. R34- Causes burns. R40- Possible risks of irreversible effects. R43- May cause sensitization by skin contact. R52- Harmful to aquatic organisms. S1/2- Keep locked up and out of the reach of children. S24- Avoid contact with skin. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of water S37/39- Wear suitable gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S56- Dispose of this material and its container at hazardous or special waste collection point.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 2

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 4

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 11:17 AM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

Creation Date 01-Jul-2010

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name Pyrene

Cat No. : AC180830000; AC180830250; AC180831000; AC180835000

Synonyms Benzo[def]phenanthrene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver.	

Label Elements

Signal Word

Warning

Hazard Statements

Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure



Prevention

Prevention

Use only outdoors or in a well-ventilated area

Do not breathe dust/fume/gas/mist/vapors/spray

Wash face, hands and any exposed skin thoroughly after handling

Do not get in eyes, on skin, or on clothing

Response

Get medical attention/advice if you feel unwell

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water

Take off contaminated clothing and wash before reuse

If skin irritation occurs: Get medical advice/attention

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention

Storage

Storage
Store in a well-ventilated place. Keep container tightly closed

Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Pyrene	129-00-0	>95

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.
Ingestion	Do not induce vomiting. Obtain medical attention.
Most important symptoms/effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available

Flash Point	210 °C / 410 °F
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO₂)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
2

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up	Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.
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7. Handling and storage

Handling	Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
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Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
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Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	148 - 152 °C / 298 - 306 °F
Boiling Point/Range	393 °C / 739.4 °F @ 760 mmHg
Flash Point	210 °C / 410 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16 H10
Molecular Weight	202.25

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Avoid dust formation.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information**Acute Toxicity**

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Pyrene	2700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic No information available

Products

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Pyrene	129-00-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)

STOT - repeated exposure Liver

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals. The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Pyrene	Not listed	Oncorhynchus mykiss: LC50 > 2mg/L 96h	Not listed	EC50 48h 1.8 mg/L EC50 48h 0.002-0.003 mg/L

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Pyrene	4.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
 Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
 Proper technical name Pyrene
 Hazard Class 9
 Packing Group III

TDG

UN-No UN3077
 Proper Shipping Name Environmentally hazardous substance, solid, n.o.s.
 Hazard Class 9
 Packing Group III

IATA

UN-No UN3077
 Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
 Hazard Class 9
 Packing Group III

IMDG/IMO

UN-No UN3077
 Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
 Hazard Class 9
 Packing Group III

15. Regulatory information**International Inventories**

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Pyrene	X	X	-	204-927-3	-		X	X	X	X	-

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
 Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Pyrene	5000 lb	5000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Pyrene	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2B Toxic materials

**16. Other information**

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-Jul-2010
Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name Selenium

Cat No. : AC419270000; AC419271000; AC419275000

Synonyms None

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01
/ **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 3
Acute Inhalation Toxicity - Dusts and Mists	Category 3
Specific target organ toxicity - (repeated exposure)	Category 2

Label Elements

Signal Word
Danger

Hazard Statements

Toxic if swallowed
Toxic if inhaled
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray

Response

Get medical attention/advice if you feel unwell

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

May cause long lasting harmful effects to aquatic life

3. Composition / information on ingredients

Component	CAS-No	Weight %
Selenium	7782-49-2	> 99.5

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Skin Contact	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.
Inhalation	Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.
Ingestion	Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. Call a physician immediately. If possible drink milk afterwards.
Most important symptoms/effects Notes to Physician	No information available. Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO ₂). Dry chemical. chemical foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Vapors may form explosive mixtures with air.

Hazardous Combustion Products

None known

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
3

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions

Ensure adequate ventilation. Use personal protective equipment.

Environmental Precautions

See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling

Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Use only in area provided with appropriate exhaust ventilation.

Storage

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep under nitrogen.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Selenium	TWA: 0.2 mg/m ³	(Vacated) TWA: 0.2 mg/m ³	IDLH: 1 mg/m ³ TWA: 0.2 mg/m ³

Component	Quebec	Mexico OEL (TWA)	Ontario TWA EV
Selenium	TWA: 0.2 mg/m ³	TWA: 0.2 mg/m ³	TWA: 0.2 mg/m ³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

A NIOSH/MSHA approved air purifying dust or mist respirator or European Standard EN 149.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Grey
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	217 - 222 °C / 422.6 - 431.6 °F
Boiling Point/Range	685 °C / 1265 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 345 °C
Vapor Density	No information available
Relative Density	4.810
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Se
Molecular Weight	78.96

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Acids, Strong oxidizing agents, Fluorine, oxygen, Metals
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Selenium	6700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	No information available
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Selenium	7782-49-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects	No information available
Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.
STOT - single exposure	None known
STOT - repeated exposure	None known
Aspiration hazard	No information available
Symptoms / effects, both acute and delayed	No information available
Endocrine Disruptor Information	No information available
Other Adverse Effects	The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability	No information available
Bioaccumulation/ Accumulation	No information available.
Mobility	No information available.

13. Disposal considerations

Waste Disposal Methods	Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.
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14. Transport information

DOT

UN-No	UN3283
Hazard Class	6.1
Packing Group	III

TDG

UN-No	UN3283
Hazard Class	6.1
Packing Group	III

IATA

UN-No	3283
Proper Shipping Name	SELENIUM COMPOUND, SOLID, N.O.S.
Hazard Class	6.1
Packing Group	III

IMDG/IMO

UN-No	3283
Proper Shipping Name	SELENIUM COMPOUND, SOLID, N.O.S.
Hazard Class	6.1
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Selenium	X	X	-	231-957-4	-		X	-	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations**TSCA 12(b)**

Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Selenium	7782-49-2	> 99.5	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Selenium	-	-	X	X

Clean Air Act

Not applicable

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Selenium	X		-

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Selenium	100 lb	-

California Proposition 65

This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Selenium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade**

No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

D1A Very toxic materials
D2B Toxic materials

**16. Other information****Prepared By**

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date

10-Feb-2015

Print Date

10-Feb-2015

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 3.14
Revision Date 12/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Styrene

Product Number : 240869
Brand : Aldrich
Index-No. : 601-026-00-0

CAS-No. : 100-42-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child.

H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: Phenylethylene Vinylbenzene
Formula	: C ₈ H ₈ C ₈ H ₈
Molecular weight	: 104.15 g/mol
CAS-No.	: 100-42-5
EC-No.	: 202-851-5
Index-No.	: 601-026-00-0

Hazardous components

Component	Classification	Concentration
Styrene	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT RE 1; Aquatic Acute 2; H226, H315, H319, H332, H351, H361, H372, H401	<= 100 %

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Container explosion may occur under fire conditions., Vapours may form explosive mixture with air.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Light sensitive.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Styrene	100-42-5	TWA	50.000000 ppm 215.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	100.000000 ppm 425.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		Peak	600.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		TWA	20.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Peripheral neuropathy Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	40.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Peripheral neuropathy Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		

		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		Peak	600 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Styrene	100-42-5	Mandelic acid plus phenylglyoxylic acid	400mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Styrene	0.2000 mg/l	In venous blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		Mandelic acid plus phenylglyoxylic acid	400mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		Styrene	40 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 32 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: liquid, clear Colour: colourless
b) Odour	sweet
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: -31 °C (-24 °F) - lit.
f) Initial boiling point and boiling range	145 - 146 °C (293 - 295 °F) - lit.
g) Flash point	32.0 °C (89.6 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 8.9 %(V) Lower explosion limit: 1.1 %(V)
k) Vapour pressure	6 hPa (5 mmHg) at 20 °C (68 °F)
l) Vapour density	3.6
m) Relative density	0.906 g/cm ³ at 25 °C (77 °F)
n) Water solubility	0.05 g/l at 25 °C (77 °F) - slightly soluble
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	490.0 °C (914.0 °F) 480.0 °C (896.0 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density 3.6

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air. Vapours may form explosive mixture with air.

10.4 Conditions to avoid

May polymerize on exposure to light.

Heat, flames and sparks.

10.5 Incompatible materials

Oxidizing agents, Copper

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - > 6,000 mg/kg

LC50 Inhalation - Rat - 4 h - 12,000 mg/m³

LD50 Dermal - Rat - male and female - > 2,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Skin irritation

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation - 24 h

Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig

Does not cause skin sensitisation.

(OECD Test Guideline 406)

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Styrene)

NTP: Reasonably anticipated to be a human carcinogen (Styrene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Suspected of damaging the unborn child. Suspected human reproductive toxicant

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: WL3675000

Dermatitis, Central nervous system depression, Nausea, Dizziness, Headache, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Endocrine system. -

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish	NOEC - Pimephales promelas (fathead minnow) - 4 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 32 mg/l - 96 h
	LOEC - Pimephales promelas (fathead minnow) - 7.6 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 4.7 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 1.4 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: > 60 % - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 2055 Class: 3 Packing group: III
Proper shipping name: Styrene monomer, stabilized
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2055 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: STYRENE MONOMER, STABILIZED

IATA

UN number: 2055 Class: 3 Packing group: III
Proper shipping name: Styrene monomer, stabilized

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.14

Revision Date: 12/02/2015

Print Date: 02/18/2016

SAFETY DATA SHEET

Version 4.17
Revision Date 03/03/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Trichlorofluoromethane

Product Number : 254991

Brand : Aldrich

CAS-No. : 75-69-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Dermal (Category 4), H312

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Warning

Hazard statement(s)

H312 : Harmful in contact with skin.

Precautionary statement(s)

P280 : Wear protective gloves/ protective clothing.
P302 + P352 + P312 : IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P363 : Wash contaminated clothing before reuse.
P501 : Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS**3.1 Substances**

Synonyms : Fluorotrichloromethane
CFC-11

Formula : CCl₃F CCl₃F
Molecular weight : 137.37 g/mol
CAS-No. : 75-69-4
EC-No. : 200-892-3

Hazardous components

Component	Classification	Concentration
Trichlorofluoromethane		
	Acute Tox. 4; H312	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas, Hydrogen fluoride

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Contents under pressure.

Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichlorofluoromethane	75-69-4	C	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Cardiac sensitization Not classifiable as a human carcinogen		
		C	1,000.000000 ppm 5,600.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1,000.000000 ppm 5,600.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 30 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | -110.99 - -109.99 °C (-167.78 - -165.98 °F) |
| f) Initial boiling point and boiling range | 23.7 °C (74.7 °F) - lit. |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 885.7 hPa (664.3 mmHg) at 20.0 °C (68.0 °F)
2,701.2 hPa (2,026.1 mmHg) at 55.0 °C (131.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.494 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | 1 g/l |
| o) Partition coefficient: n-octanol/water | log Pow: 2.53 |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 18.0 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Sodium/sodium oxides, Potassium, Magnesium, Aluminum, Zinc

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - > 15,000 mg/kg

LC50 Inhalation - Rat - 0.3 h - 130000 ppm

Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: PB6125000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated., Nausea, Dizziness, Headache, Vomiting, Diarrhoea, Abdominal pain, Weakness, Unconsciousness

Liver -

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 3082 Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Trichlorofluoromethane)

Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

Trichlorofluoromethane	CAS-No. 75-69-4	Revision Date 2007-07-01
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Pennsylvania Right To Know Components

Trichlorofluoromethane	CAS-No. 75-69-4	Revision Date 2007-07-01
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New Jersey Right To Know Components

Trichlorofluoromethane	CAS-No. 75-69-4	Revision Date 2007-07-01
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California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H312	Harmful in contact with skin.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.17

Revision Date: 03/03/2015


Print Date: 02/18/2016

Safety Data Sheets (SDS)

SECTION 1-IDENTIFICATION

Product name: Toluene
Other names:-
Proper shipping name: Toluene
Recommended use of the chemical and restrictions on use: The major use of toluene is as a mixture added to gasoline to improve octane ratings. Used as a solvent for paint, resins, lacquers inks & adhesives. Component of solvent blends and thinners. Used in the manufacture of chemicals, dyes, explosives, benzoic acid. Some grades of toluene may contain traces of xylene and benzene. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. WARNING: Intentional misuse by concentrating/inhaling contents may be lethal.
Manufacturer/Supplier Name: Taiwan SM Corp., Kaohsiung plant Address: NO.7, Industrial 1st Rd, Lin-Yuan Kaohsiung County 83203, Taiwan, R.O.C. Phone No.: 886-7-6414511
Emergency phone No./Fax No.: 886-7-6414511 Ext. 221 (on duty), 886-7-6414517 (off duty)/886-7-6423828

SECTION 2-HAZARDS IDENTIFICATION

GHS Classification:	Flammable Liquid Category 2 Acute Toxicity (Oral) Category 4 Skin Corrosion/ Irritation Category 2 Serious Eye Damage/ Eye Irritation Category 2 Specific Target Organ Toxicity Repeated Exposure Category 2 Hazardous To The Aquatic Environment (Acute) Category 3 Aspiration Hazard Category 1
GHS Label elements:	
Hazard symbols	
Signal word	Danger
Hazard statements	Highly flammable liquid and vapor Harmful if inhaled Causes skin irritation Causes serious eye irritation May cause damage to organs through prolonged or repeated exposure. May cause long lasting harmful effects to aquatic life. May be fatal if swallowed and enters airways.
Precautionary statements	Use only in well ventilated area. Control of exposure by mechanical ventilation in an unventilated or confined space. Avoid breathing vapors and contact with skin and eyes. Wear breathing apparatus/protective gloves/face protection. Store in well-ventilated place. Disposal must be in accordance with applicable federal, state, or local regulations.
Other hazards: —	

SECTION 3-COMPOSITION/INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	wt% by weight	EINECS No.
00108-88-3	Toluene	97.0 min.	203-625-9
Synonyms	Methylbenzol; Methylbenzene; Toluol; Phenylmethane		

SECTION 4-FIRST AID MEASURES

Description of necessary first aid measures

Eye:

1. Flush immediately with warm water for at least 20 minutes.
2. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
3. If pain persists or recurs seek medical attention.
4. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin:

1. Removing contaminated clothing, shoes, and leathery wearings, cleaning procedure is available before reused or waste treatment.
2. Washing affected area thoroughly with soap and water for at least 20 minutes.
3. Call a Physician if irritation develops or persists.

Ingestion:

1. If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomits.
2. If victim is conscious and alert, give 2~4 cupfuls of milk/water to dilute the substance in stomach.
3. Never give anything by mouth to an unconscious person.
4. Don't induce vomiting unless directed to do so by medical person.
5. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
6. Then seek for medical attention.

Inhalation:

1. Remove from further exposure and flush thoroughly with air.
2. Lay patient down. Keep warm and rested.
3. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
4. If respiratory irritation, seek immediate medical assistance and call a physician.

Most important symptoms/effects, acute and delayed

Headache, fatigue, drowsiness, insomnia, anorexia and pain in limbs, nervousness, impairment of memory.

Indication of immediate medical attention and special treatment needed, if necessary

For acute or short term repeated exposures to toluene:

Inhalation:

1. Inhalation overexposure can produce toxic effects. Monitor for respiratory distress.
2. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Administer supplemental oxygen with assisted ventilation, as required.
3. This material (or a component) sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material.
4. Administration of sympathomimetic drugs should be avoided.

Ingestion:

1. If ingested, this material presents a significant aspiration and chemical pneumonitis hazard.
2. Induction of emesis is not recommended.
3. Consider activated charcoal and/or gastric lavage.
4. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

SECTION 5-FIRE FIGHTING MEASURES

Extinguishing media

Foam 、CO₂ 、Dry chemical 、Water fog.

Specific hazards arising from the chemical

1. Liquid and vapor are highly flammable.
2. Severe fire hazard when exposed to heat, flame and/or oxidizers.
3. Vapor may travel a considerable distance to source of ignition.
4. Heating may cause expansion or decomposition leading to violent rupture of containers.
5. On combustion, may emit toxic fumes of carbon monoxide (CO).

Special protective equipment and precautions for fire-fighters

1. Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.
2. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles.
3. Cover pooling liquid with foam.
4. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out.
5. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines.
6. Be aware that burning liquid will float on water.
7. Notify appropriate authorities of potential fire and explosion hazard if liquid enter sewers or waterways

SECTION 6-ACCIDENTAL RELEASE MEASURES**Personal precautions, protective equipment and emergency procedure**

1. Personal protective equipment (specified in Section 8)
Eyes : Chemical safety goggles are recommended, and a face shield is added when needed.
Skin : Wear appropriate protective gloves to avoid skin contact.
Clothing: When direct contact is likely, use rubberized clothings, apron and boots.
Respiratory : When limits are exceeded, wear a respirator approved by NIOSH/MSHA for protection against organic dust, mists and vapors.
2. Remove all sources of ignition. No smoking, naked lights or ignition sources. Ventilate area of leak or spill.
3. Keep unnecessary and unprotected personnel from entering. Evacuate personnel from the danger area. Consult with an expert about the emergency procedures.

Environmental precautions

1. Prevent spillage from entering drains, surface, and groundwater.
2. Contain and recover liquid when possible. Use non-sparking tools and equipment.
3. Collect liquid in an appropriate container or absorb with an inert material (e.g. vermiculite, dry sand, earth), and place in a chemical waste container.
4. Report the accidental spill/release to Local/State government.

Methods and materials for containment and cleaning up**Minor spill:**

1. Remove all ignition sources.
2. Clean up all spills immediately.
3. Avoid breathing vapors and contact with skin and eyes.
4. Control personal contact by using protective equipment.
5. Contain and absorb small quantities with vermiculite or other absorbent material.
6. Wipe up.
7. Collect residues in a flammable waste container.

Major spill

1. Clear area of personnel and move upwind.
2. Alert emergency responders and tell them location and nature of hazard.
3. May be violently or explosively reactive.
4. Wear breathing apparatus plus protective gloves.
5. Prevent spillage from entering drains or water course.
6. No smoking, naked lights or ignition sources. Increase ventilation.
7. Stop leak if safe to do so.
8. Water spray or fog may be used to disperse/absorb vapor.
9. Contain spill with sand, earth or vermiculite.
10. Use only spark-free shovels and explosion proof equipment.
11. Collect recoverable product into labeled containers for recycling..
12. Absorb remaining product with sand, earth or vermiculite.
13. Collect solid residues and seal in labeled drums for disposal.
14. Wash area and prevent runoff into drains.
15. If contamination of drains or waterways occurs, advise emergency services.

SECTION 7-HANDLING AND STORAGE**Precautions for safe handling**

1. Wash thoroughly after handling.
2. Use only in well ventilated area.
3. Ground and bond containers when transferring.
4. Use spark-free tools and explosion proof equipment.
5. Empty containers retain product residue (liquid/vapor), and can be dangerous.
6. Do not pressurize, cut, weld, braze, solder, drill, or expose empty containers to heat, sparks or open flames.

Conditions for safe storage, including any incompatibilities

1. Store in original containers in approved flame-proof area.
2. No smoking, naked lights, heat or ignition sources.
3. DO NOT store in pits, depressions, basements or areas where vapors may be trapped.
4. Keep containers securely sealed.
5. Store away from incompatible materials in a cool, dry well ventilated area.
6. Protect containers against physical damage and check regularly for leaks.
7. Keep containers tightly closed and store in a cool, dry, well-ventilated place, plainly labeled, and out of closed vehicles.
8. Ground all equipment containing this material.
9. Observe manufacturer's storing and handling recommendations.
10. Containers should be able to withstand pressures expected from warming and cooling in storage. This flammable liquid should be stored in a separate safety cabinet or room. A refrigerated room is preferable for materials with a flash point temperature lower than 70°F (21°C).

SECTION 8-EXPOSURE CONTROLS, PERSONAL PROTECTION

OSHA - Final PELs : 200 ppm TWA.

OSHA Ceiling : 300ppm.

ACGIH : 50 ppm, skin -potential forcutaneous absorption.

NIOSH : 100 ppm TWA; 375 mg/m³ TWA; 500 ppm IDLH.

Taiwan TWA : 100 ppm (skin).

Taiwan STEL : 125 ppm (skin).

Taiwan Ceiling : -----.

Taiwan BEI : 1 mg/l (before on duty).

Engineering control

1. Process should be located at least 17 meter (50 feet) away from open flames and all high temperature operations likely to cause ignition of the styrene monomer vapor.
2. In venting styrene monomer vapors, consideration should be given to possible halogenation of the vapors by low concentrations of free chlorine and bromine with the resultant formation of lacrimations.
3. Process should be designed so that the operator is not exposed to direct contact with Toluene or the vapor. The technical problems of designing equipment, providing adequate ventilation and operating procedures which promise maximum security and economy, can best be handled by competent engineers.
4. It is essential for safety that equipment be used and maintained as recommended by the manufacturer.
5. Tanks used to store or process Toluene should be closed vessels vented to a safe point of discharge in the outside atmosphere away from operating stations, roadways, and at least 17 meter (50 feet) from possible sources of ignitions. All sparks, flames, heated surface, or other sources of ignition should be kept away from all vents. It is advisable, to provide suction on vessels when inspection or observation openings are made, to minimize or eliminate escape of vapors.

Personal protective equipment**Eye Protection:**

Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material. A suitable emergency eye wash water and safety shower should be located near the work station.

Skin protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Clothing:

Avoid skin contact. Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discard contaminated leather goods.

Respirators:

For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134). For airborne vapor concentrations that exceed the recommended protection factors for organic vapor respirators, use a full-face, positive-pressure, supplied air respirator. Due to fire and explosion hazards, do not enter atmospheres containing concentrations greater than 10% of the lower flammable limit of this product.

SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Transparent liquid	Upper/lower explosive limits : 1.2% ~ 7.1%
Odour : pleasant aromatic petroleum odour	Vapor Pressure : 22 mmHg @20°C/68°F
Odour threshold : 0.16~37 ppm (detect) 1.9~69 ppm (recognition)	Vapor Density : 3.1 (air=1)
PH : Not available	Relative density : 0.86 (water=1)
Melting/Freezing Point : -95 °C	Solubility in water : 54~58 mg/100 ml
Initial boiling point/boiling range : 110.6 °C	Partition coefficient : 2.73 (n-octanol/water)
Flash point : 4.4 °C (closed cup)	Auto-ignition temperature : 480°C
Evaporation Rate : 2.24 (BuAc=1)	Decomposition temperature : Not available
Flammability (solid/gas) : Not available	Viscosity : 0.6 mPa.s max @20°C
Molecular Formula : C ₆ H ₅ CH ₃	Molecular Weight : 92.056

SECTION 10-STABILITY AND REACTIVITY

Reactivity Vapor is explosive when exposed to heat or flame
Chemical stability Stable at room temperature in closed containers under normal storage and handling conditions.
Possibility of hazardous reaction Has not been reported.
Condition to avoid Product is highly flammable – Keep away from sources of ignition. Avoid the higher temperatures. Keep away from open fire, heating elements and heat radiating surface and prevent from forming of the vapours mixtures with air in explosion limits.
Incompatible materials Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetroxide; will attack some forms of plastics, rubber, coatings.
Hazardous decomposition products Carbon monoxide, carbon dioxide, hydrocarbons.

SECTION 11-TOXICOLOGICAL INFORMATION

Routes of exposure Eye, Skin, inhalation, Ingestion.
Symptoms (treatments as indicated in Section 4) Eye: The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated. There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain. There may be damage to the cornea. Unless treatment is prompt and adequate there may be permanent loss of vision. Conjunctivitis can occur following repeated exposure. Skin: Contact with the material may damage the health of the individual; systemic effects may result following absorption. The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. Ingestion: Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733). Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis. Inhalation: Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination. If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.

Chronic exposure: There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
Toxicity LD50: <870 mg/kg (rat, oral) LC50: 6000 ppm/6h (rat, inhalation)
Chronic effect Carcinogenicity: ACGIH : A4-Not classifiable as a Human Carcinogen. OSHA : Possible select carcinogen. IARC : Group 3 carcinogen. Epidemiology: Not available. Teratogenicity: Teratogenic effects have occurred in experimental animals. Reproductive Effects: Adverse reproductive effects have occurred in experimental animals. Neurotoxicity: Not available. Mutagenicity: Not available.





SECTION 12-ECOLOGICAL INFORMATION

Ecotoxicity LC ₅₀ (96 hr.) Fish: 7.3~22.8 mg/l EC ₅₀ (48 hr.) Water flea: — Biocentration factor (BCF): 1.67~380
Persistence and degradability <ol style="list-style-type: none"> The material are expected to form a slick on the surface of waters after release in calm sea conditions. This is expected to evaporate and enter the atmosphere where it will be degraded through reaction with hydroxyl radicals. Some of the material will become associated with benthic sediments, and it is likely to be spread over a fairly wide area of sea floor. Marine sediments may be either aerobic or anaerobic. The material, in probability, is biodegradable, under aerobic conditions. Evidence also suggests that the hydrocarbons may be degradable under anaerobic conditions although such degradation in benthic sediments may be a relatively slow process. Under aerobic conditions the material will degrade to water and carbon dioxide, while under anaerobic processes it will produce water, methane, carbon dioxide and carbon dioxide. Based on test results, as well as theoretical considerations, the potential for bioaccumulation may be high. Toxic effects are often observed in species such as blue mussel, daphnia, freshwater green algae, marine copepods and amphipods. Half-life (Air): 10~104 hr Half-life (Surface water): 96~528 hr Half-life (Ground water): 168~672 hr Half-life (Soil): 96~528 hr
Bioaccumulative potential This material is not expected to significantly bioaccumulate.
Mobility in soil: —
Other adverse effects: —

SECTION 13-DISPOSAL CONSIDERATIONS

Residues and spilled material are hazardous waste due to ignitability. Disposal must be in accordance with applicable federal, state, or local regulations. The container for this product can present explosion or fire hazards, even when emptied. To avoid risk of injury, do not cut, puncture, or weld on or near this container. Since the emptied containers retain product residue, follow label warnings even after container is emptied.

SECTION 14-TRANSPORTATION INFORMATION

US DOT	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3		
	UN Number	1294		
	Packing Group	II		
Sea(IMO/IMDG)	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3.2		
	UN Number	1294		
	Packing Group	II		
	IMDG Code Page	3285		
	MARPOL	Not a DOT "Marine Pollutant" per 49 CFR 171.8.		
Air(ICA0/IATA)	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3.2		
	Subsidiary Class	1294		
	Packing Group	II		
RID/ ADR	No information available.			
Canadian TDG	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3		
	UN Number	1294		
	Packing Group	II		
	Subsidiary Class	9.2		

SECTION 15-REGULATORY INFORMATION**US FEDERAL****TSCA**

CAS# 108-88-3 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 108-88-3: Effective Date: 10/4/82; Sunset Date: 10/4/92

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA**Section 302 (RQ)**

CAS# 108-88-3 : final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this material have a TPQ.

SARA Codes

CAS# 108-88-3 : acute, flammable.

Section 313

This material contains Toluene (CAS# 108-88-3, 99% & 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

Clean Air Act

CAS# 108-88-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

<p>Clean Water Act</p> <p>CAS# 108-88-3 is listed as a Hazardous Substance under the CWA.</p> <p>CAS# 108-88-3 is listed as a Priority Pollutant under the Clean Water Act.</p> <p>CAS# 108-88-3 is listed as a Toxic Pollutant under the Clean Water Act.</p>
<p>OSHA</p> <p>None of the chemicals in this product are considered highly hazardous by OSHA.</p>
<p>STATE</p> <p>Toluene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.</p> <p>WARNING: This product contains Toluene, a chemical known to the state of California to cause birth defects or other reproductive harm.</p> <p>California No Significant Risk Level: None of the chemicals in this product are listed.</p>
<p>European/International Regulations</p>
<p>European Labeling in Accordance with EC Directives</p> <p>Hazard Symbols: XN F</p> <p>Risk Phrases : R 10 Flammable.</p> <p>R 20 Harmful by inhalation.</p> <p>Safety Phrases : S 9 Keep container in a well-ventilated place.</p> <p>S 16 Keep away from sources of ignition - No smoking.</p> <p>S 25 Avoid contact with eyes.</p> <p>S 29 Do not empty into drains.</p> <p>S 33 Take precautionary measures against static discharges.</p>
<p>WGK (Water Danger/Protection)</p> <p>CAS# 108-88-3: 2</p>
<p>United Kingdom Occupational Exposure Limits</p> <p>CAS# 108-88-3: OES-United Kingdom, TWA 50 ppm TWA; 191 mg/m³ TWA.</p> <p>CAS# 108-88-3: OES-United Kingdom, STEL 150 ppm STEL; 574 mg/m³ STEL.</p>
<p>CANADA</p> <p>CAS#100-42-5 is listed on Canada's DSL/NDSL list.</p> <p>This product has a WHMIS classification of B2, D2A (99%)/B3, D2A (100%).</p> <p>CAS# 105-05-5 is not listed on Canada's Ingredient Disclosure List.</p>
<p>Exposure Limits</p> <ul style="list-style-type: none"> CAS# 108-88-3: OEL-AUSTRALIA:TWA 100 ppm (375 mg/m³);STEL 150 ppm (560 mg/m³) OEL-BELGIUM:TWA 100 ppm (377 mg/m³);STEL 150 ppm (565 mg/m³) OEL-CZECHOSLOVAKIA:TWA 200 mg/m³;STEL 1000 mg/m³ OEL-DENMARK:TWA 50 ppm (190 mg/m³);Skin OEL-FINLAND:TWA 100 ppm (375 mg/m³);STEL 150 ppm; Skin OEL-FRANCE:TWA 100 ppm (375 mg/m³);STEL 150 ppm (560 mg/m³) OEL-GERMANY:TWA 100 ppm (380 mg/m³) OEL-HUNGARY:TWA 100 mg/m³;STEL 300 mg/m³;Skin OEL-JAPAN:TWA 100 ppm (380 mg/m³) OEL-THE NETHERLANDS:TWA 100 ppm (375 mg/m³);Skin OEL-THE PHILIPPINES:TWA 100 ppm (375 mg/m³) OEL-POLAND:TWA 100 mg/m³ OEL-RUSSIA:TWA 100 ppm; STEL 50 mg/m³ OEL-SWEDEN:TWA 50 ppm (200 mg/m³);STEL 100 ppm (400 mg/m³);Skin OEL-SWITZERLAND:TWA 100 ppm (380 mg/m³);STEL 500 ppm OEL-THAILAND:TWA 200 ppm; STEL 300 ppm OEL-TURKEY:TWA 200 ppm (750 mg/m³) OEL-UNITED KINGDOM:TWA 100 ppm (375 mg/m³);STEL 150 ppm; Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

SECTION 16-OTHER INFORMATION

References and sources

1. CHEMINFO Data Bank, CCINFO CD, 2005-3
2. HAZARD TEXT Data Bank, TOMES PLUS CD, Vol.65, 2005
3. RETECS Data Bank, TOMES CPS CD, Vol.65, 2005
4. HSDB Data Bank, TOMES CPS CD, Vol.65, 2005
5. Hazardous Substance Data Bank, Environment Protection, Administration, Executive Yuan, ROC (Taiwan)
6. Chemwatch Data Bank, 2005-1
7. SDS, GHS in Taiwan, Council of Labor Affairs, Executive Yuan, ROC (Taiwan)

Version	Date	Remark
Version 1	06/01/1998	Original Version.
Version 2	04/20/2001	Updated 10 sections to 16 sections.
Version 3	08/01/2003	Updated "SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES".
Version 4	01/01/2006	Updated "SECTION 14-TRANSPORTATION INFORMATION".
Version 5	08/05/2008	Updated each section by GHS SDS.
Prepared by	Safety & Environment Protection Section, Taiwan SM Corporation Kaohsiung Plant.	

Issuing Date 03-Nov-2015

Revision Date 21-Jul-2015

Revision Number 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Number 601
Product Name Total Petroleum Hydrocarbons (TPH) in Water #2
Synonyms None

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory use only
Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier ERA a Waters Company
Supplier Address 16341 Table Mountain Parkway, Golden, CO 80403 USA
Non-Emergency Telephone Number +1-303-431-8454
Supplier Email sdsinfo@waters.com
Emergency telephone number
Company Emergency Phone Number In case of EMERGENCY call CHEMTREC Day or Night
 Within USA and Canada: 800-424-9300
 International Call Collect: +1-703-527-3887

2. HAZARDS IDENTIFICATION


Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1

GHS Label elements, including precautionary statements

Emergency Overview

Signal word	Danger		
Hazard Statements	Causes severe skin burns and eye damage		
			
Appearance	Clear, colorless	Physical state	Liquid->Liquid
		Odor	Odorless

Precautionary Statements - Prevention

Do not breathe dust/fume/gas/mist/vapors/spray
 Wash face, hands and any exposed skin thoroughly after handling
 Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician
 Specific treatment (see supplemental first aid instructions on this label)

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

Skin

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

Ingestion

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.

Precautionary Statements - Storage

Store locked up.

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC)

Not applicable.

Unknown Toxicity

0 % of the mixture consists of ingredient(s) of unknown toxicity.

Other information

No information available.

Interactions with Other Chemicals

No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Note: only the components contributing to the product's GHS hazard classification are listed in this section.

Chemical Name	CAS-No	Percent
Hydrochloric Acid	7647-01-0	0.09

4. FIRST AID MEASURES

First aid measures**General Advice**

Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Remove contact lenses, if present and easy to do. Continue rinsing. Seek immediate medical attention/advice.

Skin contact

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Seek immediate medical attention/advice.

Inhalation

Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary edema may occur. Get medical attention immediately if symptoms occur.

Ingestion

Do NOT induce vomiting. Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

Self-protection of the first aider

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as required. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Effects Burning sensation.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media

CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Uniform Fire Code Corrosive: Other--Liquid

Hazardous Combustion Products

Carbon oxides.

Explosion Data

Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge No.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Attention! Corrosive material. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers. Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Use only with adequate ventilation and in closed systems. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture. Store locked up. Keep out of the reach of children. Store away from other materials.

Incompatible Products Acids. Bases. Oxidizing agent.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hydrochloric Acid 7647-01-0	Ceiling: 2 ppm	(vacated) Ceiling: 5 ppm (vacated) Ceiling: 7 mg/m ³ Ceiling: 5 ppm Ceiling: 7 mg/m ³	IDLH: 50 ppm Ceiling: 5 ppm Ceiling: 7 mg/m ³

Other Exposure Guidelines

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992)

Appropriate engineering controls

Engineering Measures

Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection

Face protection shield.

Skin and body protection

Wear protective gloves and protective clothing. Long sleeved clothing. Chemical resistant apron. Impervious gloves.

Respiratory protection

No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. For environmental protection, remove and wash all contaminated protective equipment before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical state

Liquid->Liquid

Appearance

Clear, colorless

Color

No information available

Odor

Odorless

Odor Threshold

No information available

Property

Values

Remarks Method

pH

<=2

None known

Melting / freezing point

no data available

None known

Boiling point / boiling range

no data available

None known

Flash Point

no data available

None known

Evaporation Rate

no data available

None known

Flammability (solid, gas)

no data available

None known

Flammability Limit in Air

None known

Upper flammability limit

no data available

Lower flammability limit

no data available

Vapor pressure

no data available

None known

Vapor density

no data available

None known

Specific Gravity

1

None known

Water Solubility

Soluble in water

None known

Solubility in other solvents

no data available

None known

Partition coefficient: n-octanol/water

no data available

None known

Autoignition temperature

no data available

None known

Decomposition temperature

no data available

None known

Kinematic viscosity

no data available

None known

Dynamic viscosity

no data available

None known

Explosive properties no data available
Oxidizing properties no data available

Other Information

Softening Point no data available
Particle Size no data available
Particle Size Distribution

10. STABILITY AND REACTIVITY

Reactivity

no data available.

Chemical stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous Polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Exposure to air or moisture over prolonged periods.

Incompatible materials

Acids. Bases. Oxidizing agent.

Hazardous Decomposition Products

Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation

Specific test data for the substance or mixture is not available. Corrosive by inhalation. (based on components). Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs. Pulmonary edema can be fatal. May cause irritation of respiratory tract.

Eye contact

Specific test data for the substance or mixture is not available. Causes burns. (based on components). Corrosive to the eyes and may cause severe damage including blindness. Causes serious eye damage. May cause irreversible damage to eyes.

Skin contact

Specific test data for the substance or mixture is not available. May cause irritation. Prolonged contact may cause redness and irritation.

Ingestion

Specific test data for the substance or mixture is not available. Causes burns. (based on components). Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways. Ingestion may cause irritation to mucous membranes. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Component Information

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hydrochloric Acid 7647-01-0	238 - 277 mg/kg (Rat)	> 5010 mg/kg (Rabbit)	= 1.68 mg/L (Rat) 1 h

Information on toxicological effects

Symptoms

Erythema (skin redness). Burning. May cause blindness. Coughing and/ or wheezing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure**Sensitization**

No information available.

Carcinogenicity

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Hydrochloric Acid 7647-01-0		Group 1 Group 3		X

Reproductive toxicity

No information available.

STOT - single exposure

No information available.

STOT - repeated exposure

No information available.

Chronic toxicity

No known effect based on information supplied. Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen.

Target Organ Effects

Respiratory system. Eyes. Skin. Gastrointestinal tract (GI).

Aspiration Hazard

No information available.

Numerical measures of toxicity Product Information

The following values are calculated based on chapter 3.1 of the GHS document

Not applicable

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Harmful to aquatic life.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Hydrochloric Acid 7647-01-0		96h LC50: = 282 mg/L (Gambusia affinis)		

Persistence and Degradability

No information available.

Bioaccumulation

No information available

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS**Waste treatment methods****Disposal methods**

This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261).

Contaminated Packaging

Dispose of contents/containers in accordance with local regulations.

US EPA Waste Number

D002

California Hazardous Waste Codes 791

14. TRANSPORT INFORMATION**DOT**

Proper Shipping Name
Hazard Class

Not regulated
NON REGULATED
N/A

TDG

Not regulated

MEX

Not regulated

ICAO	Not regulated
IATA	Not regulated
Proper Shipping Name	NON REGULATED
Special Provisions	None
IMDG	Not regulated
Special Provisions	None
Marine Pollutant	Not applicable
RID	Not regulated
Special Provisions	None
ADR	Not regulated
Special Provisions	None
ADN	Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	All components are listed either on the DSL or NDSL.
ENCS	Contact supplier for inventory compliance status
KECL	Contact supplier for inventory compliance status
PICCS	Contact supplier for inventory compliance status
AICS	Contact supplier for inventory compliance status

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS-No	Percent	SARA 313 - Threshold Values %
Hydrochloric Acid - 7647-01-0	7647-01-0	0.09	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Hydrochloric Acid 7647-01-0	5000 lb			X

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level

pertaining to releases of this material

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Hydrochloric Acid 7647-01-0	5000 lb	5000 lb	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

International Regulations

Component	Carcinogen Status	Exposure Limits
Hydrochloric Acid 7647-01-0 (0.09)		Mexico: Ceiling 5 ppm Mexico: Ceiling 7 mg/m ³

Canada

WHMIS Hazard Class

Not determined

16. OTHER INFORMATION

NFPA	Health Hazards 3	Flammability 0	Instability 0	Physical and Chemical Hazards -
HMIS	Health Hazards 3	Flammability 0	Physical Hazard 0	Personal Protection X

Prepared By

Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date

03-Nov-2015

Revision Date

21-Jul-2015

Revision Note

No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text



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End of Safety Data Sheet



SAFETY DATA SHEET

Xylene

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Date issued 11.11.2013

1.1. Product identifier

Product name Xylene
Chemical name Xylene
Synonyms Xylol, dimethyl benzene, xylenol
REACH Reg No. 01-2119488216-32-0000
CAS no. 1330-20-7
EC no. 215-535-7
Index no. 601-022-00-9
Article no. 13000000

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/preparation For the preparation of paints and as a solvent. General purpose cleaner.

1.3. Details of the supplier of the safety data sheet

Manufacturer

Company name Fred Holmberg & Co AB
Office address Geijersgatan 8
Postal address Box 60056
Postcode S-216 10
City Limhamn
Country Sweden
Tel +46 (0)40 15 79 20
Fax +46 (0)40 16 22 95
E-mail info@holmberg.se
Website <http://www.holmberg.se/en/>

1.4. Emergency telephone number

Emergency telephone 112 (Europe)

SECTION 2: Hazards identification

2.1. Classification of substance or mixture

Classification according to Xi; R38
67/548/EEC or 1999/45/EC Xn; R20/21
R10
Classification according to Flam. Liq. 3; H226;
Regulation (EC) No 1272/2008 Acute tox. 4; H312;
[CLP/GHS] Skin Irrit. 2; H315;
Acute tox. 4; H332;

2.2. Label elements

Hazard Pictograms (CLP)



Signal word	Danger
Hazard statements	H226 Flammable liquid and vapour. H312 Harmful in contact with skin. H315 Causes skin irritation. H332 Harmful if inhaled.
Precautionary statements	P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking. P233 Keep container tightly closed. P243 Take precautionary measures against static discharge. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P331 Do NOT induce vomiting. P403 + P235 Store in a well-ventilated place. Keep cool.

2.3. Other hazards

Other hazards	Not known.
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SECTION 3: Composition/information on ingredients

3.2. Mixtures

Substance	Identification	Classification	Contents
Xylene	CAS no.: 1330-20-7 EC no.: 215-535-7 Index no.: 601-022-00-9	R10 Xn; R20/21 Xi; R38 Flam. Liq. 3; H226 Acute tox. 4; H332 Acute tox. 4; H312 Skin Irrit. 2; H315 Note : C	75 - 90 %
Ethylbenzene	CAS no.: 100-41-4 EC no.: 202-849-4 Index no.: 601-023-00-4 Synonyms: Ethylbenzene	F; R11 Xn; R20 Flam. Liq. 2; H225 Acute tox. 4; H332	10 - 25 %

Column headings	CAS no. = Chemical Abstracts Service; EU (Einecs or Elincs number) = European inventory of Existing Commercial Chemical Substances; Ingredient name = Name as specified in the substance list (substances that are not included in the substance list must be translated, if possible). Contents given in; %, %wt/wt, %vol/wt, %vol/vol, mg/m3, ppb, ppm, weight%, vol%
HH/HF/HE	T+ = Very toxic, T = Toxic, C = Corrosive, Xn = Harmful, Xi = Irritating, E = Explosive, O = Oxidizing, F+ = Extremely flammable, F = Very flammable, N = Environmental hazard

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Move the exposed person to fresh air at once. Get medical attention if any discomfort continues.
Skin contact	Remove contaminated clothes and rinse skin thoroughly with water.
Eye contact	Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention if any discomfort continues.
Ingestion	NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Do not induce vomiting. Rinse mouth with water. Get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Information for health personnel	Treat Symptomatically. Do not give victim anything to drink if he is
----------------------------------	--

unconscious.

4.3. Indication of any immediate medical attention and special treatment needed

Specific details on antidotes

No recommendation given.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

Suitable extinguishing media

Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.

5.2. Special hazards arising from the substance or mixture

Fire and explosion hazards

Solvent vapours may form explosive mixtures with air.

Hazardous combustion products

Fire creates: Carbon monoxide (CO). Carbon dioxide (CO₂).**5.3. Advice for firefighters**

Fire fighting procedures

No specific fire fighting procedure given.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Personal protection measures

Ensure suitable personal protection (including respiratory protection) during removal of spillages in a confined area. Ventilate well. Stop leak if possible without risk. Avoid contact with skin and eyes. Do not breathe vapour.

6.2. Environmental precautions

Environmental precautionary measures

Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Cleaning method

Dam and absorb spillages with sand, earth or other non-combustible material.

6.4. Reference to other sections

Other instructions

No recommendation given.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Handling

Keep away from heat, sparks and open flame. Take precautionary measures against static discharges. Mechanical ventilation may be required.

Protective Safety Measures

Advice on general occupational hygiene

Provide easy access to water supply and eye wash facilities.

7.2. Conditions for safe storage, including any incompatibilities

Storage

Keep away from heat, sparks and open flame. Ground container and transfer equipment to eliminate static electric sparks. Store in a cool and well-ventilated place.

7.3. Specific end use(s)

Specific use(s)

Not entered.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****DNEL / PNEC**

Method of testing

Contents

DNEL

Group: Industrial

Exposure route: Inhalation

Exposure frequency: Short term (acute)

Critical Component: Etylbenzen

Value: 289 mg/kg/dag

DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 77 mg/kg/dag
DNEL	Group: Industrial Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 180 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 14,8 mg/kg/dag
DNEL	Group: Consumer Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 108 mg/kg/dag
DNEL	Group: Consumer Exposure route: Oral Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 1,6 mg/kg/dag
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: xylen Value: 442 mg/kg/dag
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 221 mg/kg/dag
DNEL	Group: Industrial Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 3182 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: xylen Value: 260 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect

DNEL	Value: 65,3 mg/kg/dag Group: Consumer Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: xylene Type of effect: Systemic effect
DNEL	Value: 1872 mg/kg/dag Group: Consumer Exposure route: Oral Exposure frequency: Long term (repeated) Critical Component: xylene Type of effect: Systemic effect
Exposure guidelines	Value: 12,5 mg/kg/dag Country of origin: Sverige Limit value type: NGV 200 mg/m ³ OEL Short Term Value: 450 mg/m ³ Source: Nationella hygieniska gränsvärden, AFS 2005:17 Ovanstående NGV resp. KTV gäller både xylene och etylbenzen
Other Information	

8.2. Exposure controls

Occupational exposure limits	Provide adequate ventilation. Observe Occupational Exposure Limits and minimise the risk of inhalation of vapours. Protective gloves and goggles are recommended. Provide eyewash, quick drench.
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Safety signs



Respiratory protection

Respiratory protection	Respiratory protection must be used if air contamination exceeds acceptable level. Use respiratory equipment with gas filter, type A2.
------------------------	--

Hand protection

Hand protection	Use protective gloves. Chemical resistant gloves required for prolonged or repeated contact. Gloves of nitrile rubber, PVA or Viton are recommended.
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Eye / face protection

Eye protection	Use safety goggles or face shield in case of splash risk.
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Skin protection

Skin protection (except hands)	Wear appropriate clothing to prevent any possibility of skin contact.
--------------------------------	---

Hygiene / Environmental

Specific hygiene measures	Wash hands after contact.
---------------------------	---------------------------

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Fluid.
Colour	Colourless.
Odour	Aromatic.
Comments, pH (as supplied)	Not relevant.
Melting point/melting range	Value: < -48 °C
Boiling point / boiling range	Value: 136-145 °C
Flash point	Value: 27 °C
Evaporation rate	Value: 13,5
Explosion limit	Value: 1-7,1 %
Vapour pressure	Value: 1 kPa
	Test temperature: 20 °C

Vapour density	Value: 3,7
Specific gravity	Value: 0,870 kg/m ³ Test temperature: 20 °C
Solubility description	Soluble in: Organic solvents. Not soluble in water.
Partition coefficient: n-octanol/water	Value: 3,15
Spontaneous combustability	Value: > 432-530 °C
Viscosity	Value: < 0,90 mPas Method of testing: Kinematisk Test temperature: 25 °C

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	Heating may cause a fire.
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10.2. Chemical stability

Stability	Stable under the prescribed storage conditions.
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10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	Not known.
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10.4. Conditions to avoid

Conditions to avoid	Avoid heat, flames and other sources of ignition.
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10.5. Incompatible materials

Materials to avoid	Avoid contact with oxidising agents (e.g. nitric acid, peroxides and chromates). Strong acids.
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10.6. Hazardous decomposition products

Hazardous decomposition products	Fire creates: Carbon monoxide (CO). Carbon dioxide (CO ₂).
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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological Information:

Other toxicological data	Acute Toxicity (Oral LD ₅₀): mg/kg (oral rat) > 2000 Acute Toxicity (Inhalation LC ₅₀): mg/l (vapours) (4h) > 20 Acute Toxicity (Dermal LD ₅₀): mg/kg Rabbit > 2000
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Toxicological data for substances

Potential acute effects

Inhalation	In high concentrations, vapours are narcotic and may cause headache, fatigue, dizziness and nausea. Ikke klassificerad som aspirationstoxisk (Not classified as asp. tox.)
Skin contact	Prolonged or frequent contact may cause redness, itching, eczema and skin cracking. Defats the skin.
Eye contact	May irritate and cause redness and pain.
Ingestion	Ingestion of large amounts may cause unconsciousness. However, ingestion may cause nausea, headache, dizziness and intoxication. Ingestion may cause irritation of the gastrointestinal tract, vomiting and diarrhoea. May cause irritation to the mouth and throat.

Delayed effects / repeated exposure

Sensitisation	Not known.
Chronic effects	None known.

Carcinogenic, Mutagenic or Reprotoxic

Carcinogenicity	None.
Mutagenicity	Not known.
Teratogenic properties	Suspected of damaging the unborn child

Reproductive toxicity Not known.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic, fish	Value: 2 mg/l Method of testing: LC50 Fish, species: <i>Roccus saxatilis</i> Duration: 96h
Acute aquatic, algae	Value: > 3,2 mg/l Method of testing: IC50 Algae, species: <i>Selenastrum Capricornum</i> Duration: 72h
Acute aquatic, Daphnia	Value: 8,5 mg/l Method of testing: EC50 Daphnia, species: <i>Daphnia magna</i> Duration: 48h

12.2. Persistence and degradability

Persistence and degradability description	Lättnedbrytbar av biologiska organismer.
Chemical oxygen demand (COD)	Value: 5 Method of testing: COD
Biological oxygen demand (BOD)	Value: 0,55 Method of testing: BOD

12.3. Bioaccumulative potential

Bioaccumulative potential	Will not bio-accumulate.
Bioconcentration factor (BCF)	Value: 22 Method of testing: BCF

12.4. Mobility in soil

Mobility	The product is insoluble in water and will spread on the water surface.
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12.5. Results of PBT and vPvB assessment

PBT assessment results	This substance is not classified as PBT or vPvB.
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12.6. Other adverse effects

Other adverse effects / Remarks	None known.
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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Specify the appropriate methods of disposal	Confirm disposal procedures with environmental engineer and local regulations. Absorb in vermiculite or dry sand and dispose of at a licenced hazardous waste collection point. Liquid components can be disposed of by incineration.
Product classified as hazardous waste	Yes
Packaging classified as hazardous waste	Yes

SECTION 14: Transport information

14.1. UN number

ADR	1307
RID	1307
IMDG	1307
ICAO/IATA	1307

14.2. UN proper shipping name

ADR	XYLENES
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RID	XYLENES
IMDG	XYLENES
ICAO/IATA	XYLENES

14.3. Transport hazard class(es)

ADR	3
Hazard no.	30
RID	3
ADN	33
IMDG	3
ICAO/IATA	3

14.4. Packing group

ADR	III
RID	III
IMDG	III
ICAO/IATA	III

14.5. Environmental hazards

Comment	Not relevant.
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14.6. Special precautions for user

EmS	F-E, S-D
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14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

EC no.	215-535-7
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15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Other Label Information	Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments.
Legislation and regulations	Dangerous Substance Directive 67/548/EEC. The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (S.I. 2009 No. 716). The List of Wastes (England) (Amendment) Regulations 2005. (SI 2005 No. 895). Avfallsförordningen (2011:927).

15.2. Chemical safety assessment

SECTION 16: Other information

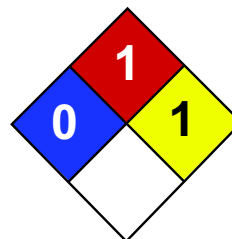
Hazard symbol



Irritant

R-phrases	R10 Flammable. R38 Irritating to skin. R20/22 Harmful by inhalation and if swallowed. R38 Irritating to skin.
S-phrases	S7 Keep container tightly closed. S16 Keep away from sources of ignition - No smoking.
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Flam. Liq. 3; H226; Acute tox. 4; H312; Skin Irrit. 2; H315;

List of relevant R-phrases (under headings 2 and 3).	Acute tox. 4; H332; R38 Irritating to skin. R11 Highly flammable. R10 Flammable. R20/21 Harmful by inhalation and in contact with skin. R20 Harmful by inhalation.
List of relevant H-phrases (Section 2 and 3).	H332 Harmful if inhaled. H312 Harmful in contact with skin. H225 Highly flammable liquid and vapour. H226 Flammable liquid and vapour. H315 Causes skin irritation.
Responsible for safety data sheet	Fred Holmberg & Co AB



Health	1
Fire	1
Reactivity	1
Personal Protection	E

Material Safety Data Sheet

Zinc Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Zinc Metal

Catalog Codes: SLZ1054, SLZ1159, SLZ1267, SLZ1099, SLZ1204

CAS#: 7440-66-6

RTECS: ZG8600000

TSCA: TSCA 8(b) inventory: Zinc Metal

CI#: Not applicable.

Synonym: Zinc Metal Sheets; Zinc Metal Shot; Zinc Metal Strips

Chemical Name: Zinc Metal

Chemical Formula: Zn

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Zinc Metal	7440-66-6	100

Toxicological Data on Ingredients: Zinc Metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials, of acids, of alkalis, of moisture. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Zinc + NaOH causes ignition. Oxidation of zinc by potassium proceeds with incandescence. Residues from zinc dust /acetic acid reduction operations may ignite after long delay if discarded into waste bins with paper. Incandescent reaction when Zinc and Arsenic or Tellurium, or Selenium are combined. When hydrazine mononitrate is heated in contact with zinc, a flaming decomposition occurs at temperatures a little above its melting point. Contact with acids and alkali hydroxides (sodium hydroxide, potassium hydroxide, calcium hydroxide, etc.) results in evolution of hydrogen with sufficient heat of reaction to ignite the hydrogen gas. Zinc foil ignites if traces of moisture are present. It is water reactive and produces flammable gases on contact with water. It may ignite on contact with water or moist air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Flammable solid that, in contact with water, emits flammable gases. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 65.39 g/mole

Color: Bluish-grey

pH (1% soln/water): Not applicable.

Boiling Point: 907°C (1664.6°F)

Melting Point: 419°C (786.2°F)

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, moisture

Incompatibility with various substances:

Reactive with oxidizing agents, acids, alkalis. Slightly reactive to reactive with moisture. The product may react violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with acids, halogenated hydrocarbons, NH_4NO_3 , barium oxide, $\text{Ba}(\text{NO}_3)_2$, Cadmium, CS_2 , chlorates, Cl_2 , CrO_3 , F_2 , Hydroxylamine, $\text{Pb}(\text{N}_3)_2$, MnCl_2 , HNO_3 , performic acid, KClO_3 , KNO_3 , N_2O_2 , Selenium, NaClO_3 , Na_2O_2 , Sulfur, Te, water, $(\text{NH}_4)_2\text{S}$, As_2O_3 , CS_2 , CaCl_2 , chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl , H_2SO_4 , $(\text{Mg} + \text{Ba}(\text{NO}_3)_2 + \text{BaO}_2)$, (ethyl acetoacetate +tribromoneopentyl alcohol. Contact with Alkali Hydroxides(Sodium Hydroxide, Potassium Hydroxide, Calcium Hydroxide, etc) results in evolution of hydrogen. Ammonium nitrate + zinc + water causes a violent reaction with evolution of steam and zinc oxide. May react with water.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Dermal exposure to zinc may produce leg pains, fatigue, anorexia and weight loss. Eyes: May cause eye irritation. Ingestion: May be harmful if swallowed. May cause digestive tract irritation with tightness in throat, nausea, vomiting, diarrhea, loss of appetite, malaise, abdominal pain. fever, and chills. May affect behavior/central nervous system and autonomic nervous system with ataxia, lethargy, staggering gait, mild derrangement in cerebellar function, lightheadness, dizziness, irritability, muscular stiffness, and pain. May also affect blood. Inhalation: Inhalation of zinc dust or fumes may cause respiratory tract and mucous membrane irritation with cough and chest pain. It can also cause "metal fume fever", a flu-like condition characterized appearance of chills, headached fever, maliase, fatigue, sweating, extreme thirst, aches in the legs and chest, and difficulty in breathing. A sweet taste may also be be present in metal fume fever, as well as a dry throat, aches, nausea, and vomiting, and pale grey cyanosis. The toxicological properties of this substance have not been fully investisgated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

New York release reporting list: Zinc Metal Rhode Island RTK hazardous substances: Zinc Metal Pennsylvania RTK: Zinc Metal Florida: Zinc Metal Michigan critical material: Zinc Metal Massachusetts RTK: Zinc Metal New Jersey: Zinc Metal California Director's List of Hazardous Substances: Zinc Metal TSCA 8(b) inventory: Zinc Metal TSCA 12(b) one time export: Zinc Metal SARA 313 toxic chemical notification and release reporting: Zinc Metal CERCLA: Hazardous substances.: Zinc Metal: 1000 lbs. (453.6 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not Available

DSCL (EEC):

R15- Contact with water liberates extremely flammable gases. R17- Spontaneously flammable in air. S7/8- Keep container tightly closed and dry.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:18 AM

Last Updated: 11/06/2008 12:00 PM

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SAFETY DATA SHEET

Version 5.4
Revision Date 03/05/2015
Print Date 02/19/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Freon® 113 solution

Product Number : 48411

Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

Acute toxicity, Inhalation (Category 3), H331

Acute toxicity, Dermal (Category 3), H311

Specific target organ toxicity - single exposure (Category 1), H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301 + H311 + H331
H370

Toxic if swallowed, in contact with skin or if inhaled
Causes damage to organs.

Precautionary statement(s)

P260

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P271

Use only outdoors or in a well-ventilated area.

P280

Wear protective gloves/ protective clothing.

P301 + P310 + P330

IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.

P302 + P352 + P312

IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.

P304 + P340 + P311	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P307 + P311	IF exposed: Call a POISON CENTER or doctor/ physician.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Synonyms : 1,1,2-Trichloro-1,2,2-trifluoroethanesolution

Hazardous components

Component	Classification	Concentration
Methanol		
CAS-No. 67-56-1	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301 + H311 + H331, H370	>= 90 - <= 100 %
EC-No. 200-659-6		
Index-No. 603-001-00-X		
Registration number 01-2119433307-44-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		

		TWA	200.000000 ppm 260.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250.000000 ppm 325.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200.000000 ppm 260.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm

Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.

If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Zinc, Acids, Oxidizing agents, Alkali metals, Powdered metals, Potassium, Acid chlorides, Acid anhydrides, Reducing agents, Aluminum, Sodium/sodium oxides, Magnesium

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Methyl alcohol may be fatal or cause blindness if swallowed., Cannot be made non-poisonous., Effects due to ingestion may include:, Nausea, Dizziness, Gastrointestinal disturbance, Weakness, Confusion., Drowsiness, Unconsciousness, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1230 Class: 3
Proper shipping name: Methanol
Reportable Quantity (RQ): 5000 lbs

Packing group: II

Poison Inhalation Hazard: No

IMDG

UN number: 1230 Class: 3 (6.1)
Proper shipping name: METHANOL

Packing group: II

EMS-No: F-E, S-D

IATA

UN number: 1230 Class: 3 (6.1)
Proper shipping name: Methanol

Packing group: II

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

1,1,2-Trichlorotrifluoroethane

76-13-1

2007-07-01

New Jersey Right To Know Components

Methanol

CAS-No.
67-56-1

Revision Date
2007-07-01

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

CAS-No.
67-56-1

Revision Date
2012-03-16

Methanol

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H370	Causes damage to organs.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4

Revision Date: 03/05/2015

Print Date: 02/19/2016

SAFETY DATA SHEET

Version 4.10
Revision Date 01/28/2016
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Biphenyl

Product Number : W312908
Brand : Aldrich
Index-No. : 601-042-00-8

CAS-No. : 92-52-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H315

Causes skin irritation.

H319

Causes serious eye irritation.

H335

May cause respiratory irritation.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264

Wash skin thoroughly after handling.

P271

Use only outdoors or in a well-ventilated area.

P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₁₂ H ₁₀
Molecular weight	: 154.21 g/mol
CAS-No.	: 92-52-4
EC-No.	: 202-163-5
Index-No.	: 601-042-00-8

Hazardous components

Component	Classification	Concentration
Biphenyl		
	Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Biphenyl	92-52-4	TWA	0.2 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Pulmonary function		
		TWA	0.200000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Pulmonary function		

		TWA	0.2 ppm 1 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.200000 ppm 1.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	0.2 ppm 1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	0.200000 ppm 1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm

Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 30 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: crystalline Colour: light yellow
b) Odour	characteristic
c) Odour Threshold	No data available
d) pH	5.5
e) Melting point/freezing point	Melting point/range: 68 - 70 °C (154 - 158 °F) - lit.
f) Initial boiling point and boiling range	255 °C (491 °F) - lit.
g) Flash point	110 °C (230 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	The product is not flammable. - Flammability (solids)
j) Upper/lower flammability or explosive limits	Upper explosion limit: 5.8 %(V) Lower explosion limit: 0.6 %(V)
k) Vapour pressure	0.04 hPa (0.03 mmHg) at 20 °C (68 °F) 5.5 hPa (4.1 mmHg) at 100 °C (212 °F) 12.6 hPa (9.5 mmHg) at 115 °C (239 °F) 95.7 hPa (71.8 mmHg) at 166 °C (331 °F)
l) Vapour density	No data available
m) Relative density	0.992 g/cm ³
n) Water solubility	0.0075 g/l at 15 °C (59 °F)
o) Partition coefficient: n-octanol/water	log Pow: 4.008 at 25 °C (77 °F)
p) Auto-ignition temperature	566 °C (1,051 °F) at 1,013.0 hPa (759.8 mmHg)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Inhalation: No data available

LD50 Dermal - Rabbit - > 5,010 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Irritating to skin. - 24 h

(Draize Test)

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig

Does not cause skin sensitisation.

(OECD Test Guideline 406)

Germ cell mutagenicity

Ames test

S. typhimurium

Result: negative

Mouse - male and female

Result: negative

Carcinogenicity

Carcinogenicity - Mouse - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration: Tumors. Blood: Tumors.

Carcinogenicity - Mouse - Subcutaneous

Tumorigenic: Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration: Tumors. Liver: Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DU8050000

Liver injury may occur., Gastrointestinal disturbance

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish flow-through test LC50 - Pimephales promelas (fathead minnow) - 3 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates flow-through test EC50 - Daphnia magna (Water flea) - 0.36 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 14 d
Result: 84 % - Readily biodegradable
(OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation Leuciscus idus (Golden orfe) - 3 d
- 50 µg/l

Bioconcentration factor (BCF): 281

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Biphenyl)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Biphenyl)
Marine pollutant: yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Biphenyl)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Biphenyl	92-52-4	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Biphenyl	92-52-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Biphenyl	92-52-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Biphenyl	92-52-4	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10

Revision Date: 01/28/2016

Print Date: 02/18/2016

SAFETY DATA SHEET

Version 6.5
Revision Date 05/02/2022
Print Date 05/14/2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : 1,2,4,5-Tetramethylbenzene

Product Number : T19607
Brand : Aldrich
CAS-No. : 95-93-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable solids (Category 1), H228
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word : Danger

Hazard statement(s)
H228 : Flammable solid.

H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	: Durene 1,2,4,5-Tetramethylbenzene
Formula	: C ₁₀ H ₁₄
Molecular weight	: 134.22 g/mol
CAS-No.	: 95-93-2
EC-No.	: 202-465-7

Component	Classification	Concentration
1,2,4,5-tetramethylbenzene		
	Flam. Sol. 1; Aquatic Acute 1; Aquatic Chronic 1; H228, H400, H410 M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 1	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact

After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed

After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing media**

Water Foam Carbon dioxide (CO₂) Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Combustible.

Vapors are heavier than air and may spread along floors.

Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep away from heat and sources of ignition.

Storage class

Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: KCL 741 Dermatril® L

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: KCL 741 Dermatril® L

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: crystals
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 76 - 80 °C (169 - 176 °F) - lit.
f) Initial boiling point and boiling range	191 - 193 °C 376 - 379 °F
g) Flash point	74 °C (165 °F) - c.c.
h) Evaporation rate	No data available
i) Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
j) Upper/lower flammability or explosive limits	No data available
k) Vapor pressure	No data available
l) Vapor density	No data available
m) Density	0.838 g/mL at 25 °C (77 °F) - lit.
Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Autoignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Oxidizing agents

10.4 Conditions to avoid

Strong heating.

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 6,700 mg/kg

Remarks: (RTECS)

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

11.2 Additional Information

RTECS: DC0500000

The data available to us do not suffice to permit any industrial-toxicological assessment.

Further toxicological data:

Risk of absorption.

Other dangerous properties can not be excluded.

Further data:

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information**12.1 Toxicity**

Toxicity to fish

LC0 - Leuciscus idus (Golden orfe) - 10 mg/l - 48 h
Remarks: (ECOTOX Database)

LC50 - Leuciscus idus (Golden orfe) - 30 mg/l - 48 h
Remarks: (ECOTOX Database)

LC100 - Leuciscus idus (Golden orfe) - 50 mg/l - 48 h
Remarks: (ECOTOX Database)

Toxicity to daphnia
and other aquatic
invertebrates

EC50 - Daphnia magna (Water flea) - 0.47 mg/l - 48 h
Remarks: (External MSDS)

12.2 Persistence and degradability

Not readily biodegradable.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 1325 Class: 4.1 Packing group: II
Proper shipping name: Flammable solids, organic, n.o.s. (1,2,4,5-tetramethylbenzene)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG

UN number: 1325 Class: 4.1 Packing group: II EMS-No: F-A, S-G
Proper shipping name: FLAMMABLE SOLID, ORGANIC, N.O.S. (1,2,4,5-tetramethylbenzene)
Marine pollutant : yes

IATA

UN number: 1325 Class: 4.1 Packing group: II
Proper shipping name: Flammable solid, organic, n.o.s. (1,2,4,5-tetramethylbenzene)

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

1,2,4,5-tetramethylbenzene

CAS-No.
95-93-2

Revision Date

New Jersey Right To Know Components

1,2,4,5-tetramethylbenzene

CAS-No.
95-93-2

Revision Date

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.5

Revision Date: 05/02/2022

Print Date: 05/14/2022

SAFETY DATA SHEET

Version 3.11
Revision Date 05/24/2016
Print Date 10/31/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,2,4-Trichlorobenzene

Product Number : 296104

Brand : Sigma-Aldrich

Index-No. : 602-087-00-6

CAS-No. : 120-82-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302

Skin irritation (Category 2), H315

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302

H315

H400

H411

Harmful if swallowed.

Causes skin irritation.

Very toxic to aquatic life.

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264

P270

P273

P280

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

Avoid release to the environment.

Wear protective gloves.

P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₆ H ₃ Cl ₃
Molecular weight	: 181.45 g/mol
CAS-No.	: 120-82-1
EC-No.	: 204-428-0
Index-No.	: 602-087-00-6

Hazardous components

Component	Classification	Concentration
1,2,4-Trichlorobenzene		
	Acute Tox. 4; Skin Irrit. 2; Aquatic Acute 1; Aquatic Chronic 2; H302, H315, H400, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,2,4-Trichlorobenzene	120-82-1	C	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation		
		C	5.000000 ppm 40.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5 ppm 40 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | 16.0 °C (60.8 °F) |
| f) Initial boiling point and boiling range | 214.0 °C (417.2 °F) |
| g) Flash point | 110.0 °C (230.0 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | Upper explosion limit: 6.6 %(V)
Lower explosion limit: 2.5 %(V) |
| k) Vapour pressure | 1.3 hPa (1.0 mmHg) at 40.0 °C (104.0 °F) |
| l) Vapour density | No data available |

m) Relative density	1.45 g/cm ³
n) Water solubility	insoluble
o) Partition coefficient: n-octanol/water	log Pow: 4.00
p) Auto-ignition temperature	571.0 °C (1,059.8 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

LD50 Oral - Rat - 756.0 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Convulsions or effect on seizure threshold.

Inhalation: No data available

Inhalation: No data available

Dermal: No data available

LD50 Dermal - Rat - 6,139 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Convulsions or effect on seizure threshold.

No data available

No data available

Skin corrosion/irritation

No data available

Skin - Rabbit

Result: Skin irritation

Serious eye damage/eye irritation

No data available

No data available

Respiratory or skin sensitisation

No data available

No data available

Germ cell mutagenicity

No data available

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DC2100000

Nausea, Dizziness, Headache, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No data available

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 1.32 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates LC50 - Daphnia magna (Water flea) - 1.7 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2321 Class: 6.1 Packing group: III
Proper shipping name: Trichlorobenzenes, liquid
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2321 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TRICHLOROBENZENES, LIQUID
Marine pollutant: yes

IATA

UN number: 2321 Class: 6.1 Packing group: III
Proper shipping name: Trichlorobenzenes, liquid

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H315	Causes skin irritation.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.11

Revision Date: 05/24/2016

Print Date: 10/31/2016

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Company: AccuStandard, Inc.
125 Market Street
New Haven, CT 06513

Date MSDS Printed: 4/21/2006
Preparation Date: 4/21/2006
Information Phone Number: 203-786-5290
Emergency Phone Number: 203-786-5290
Hours: Mon. to Fri. 8am-5pm EDT

MSDS Number: V-029

Product Name: 1,2,4-Trimethylbenzene

Synonyms: 1,2,4-Trimethylbenzene; Pseudocumene; psi-Cumene; Assymetrical trimethylbenzene

Formula: C₉H₁₂

Molecular Weight: 120.19

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Component(s) (1)	CAS #	Appr. %	ACGIH-TLV (mg/m3)		OSHA-PEL (mg/m3)	
			TWA	STEL skin	TWA	STEL skin
1,2,4-Trimethylbenzene	95-63-6	100	123			

SECTION 3 - HAZARDS IDENTIFICATION**Symptoms of Exposure:**

Irritating to eyes, skin, mucous membranes and upper respiratory system.

Narcotic in high concentrations.

May cause headache, dizziness, nausea, and narcosis.

May cause stomach cramps and gastro-intestinal disturbances.

To the best of our knowledge the chemical, physical and toxicological properties of the component ingredients have not been thoroughly investigated.

Potential Health Effects:

Harmful if inhaled.

May be harmful if absorbed through skin or swallowed

May cause central nervous system damage.

Routes of Entry:

Inhalation, ingestion or skin contact.

Carcinogenicity:

This product is or contains a component that is not listed (ACGIH, IARC, NTP, OSHA) as a cancer causing agent.

SECTION 4 - FIRST AID MEASURES

Emergency First Aid:

Get medical assistance for all cases of overexposure.

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

Ingestion: Call a physician or poison control center immediately. ONLY induce vomiting at the instructions of a physician. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: 118.4 °F (48 °C) (cc)

Flammable Limits LEL (%): 0.9

Flammable Limits UEL (%): 6.4

Autoignition Temperature: 515 °C

Flammable liquid and vapor.

Vapors can travel to a source of ignition and flash back.

Containers can build up pressure if exposed to heat.

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media:

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Fire Fighting Procedures:

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response:

Wear a self-contained breathing apparatus and appropriate Personal protection. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. Take up and containerize for proper disposal. Flush spill area with water. Keep combustibles away from spilled material. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container.

Store in a cool area away from ignition sources and oxidizers.

Do not breathe vapor.

Do not get in eyes, on skin or clothing.

Avoid prolonged or repeated exposure.

This product should only be used by persons trained in the safe handling of hazardous chemicals.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls and Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other

NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Compatible chemical-resistant protective gloves must be worn to prevent skin contact.

Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Odor: Aromatic

pH: N/A

Vapor Pressure: 7 mmHg (44.4 °C)

Vapor Density (Air = 1): 4.2 g/l

Boiling Point: 168 - 169 °C

Melting Point: -43.7 °C

Solubility in Water (%): Insoluble

Specific Gravity (H₂O = 1): 0.876 g/cm³

Flash Point: 118.4 °F (48 °C) (cc)

Explosion Limits (%): 0.9 to 6.4

Autoignition Temperature: 515 °C

Percent Volatile: N/A

Evaporation Rate (BuAc = 1): N/A

Molecular Weight: 120.19

Molecular Formula: C₉H₁₂

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions To Avoid: Heat; Contact with ignition sources

Materials To Avoid: Oxidizers

Hazardous Decomposition: Carbon oxides

Hazardous Polymerization: Will not occur

SECTION 11 - TOXICOLOGICAL INFORMATION

See section 3 for specific toxicological information for the ingredients of this product.

SECTION 12 - ECOLOGICAL INFORMATION

By complying with sections 6 and 7 there will be no release to the environment.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT UN Number: UN3295 Shipping Class: 3 Packing Group: III FLAMMABLE

SECTION 15 - REGULATORY INFORMATION

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make
NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

* * * End of Document * * *

SAFETY DATA SHEET

Version 4.7
Revision Date 11/26/2015
Print Date 02/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : 1,2-Dichlorobenzene

Product Number : 240664
Brand : Sigma-Aldrich
Index-No. : 602-034-00-7

CAS-No. : 95-50-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitisation (Category 1), H317
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H227 Combustible liquid.
H302 + H332 Harmful if swallowed or if inhaled
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.

H335	May cause respiratory irritation.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₆ H ₄ Cl ₂
Molecular weight	: 147.00 g/mol
CAS-No.	: 95-50-1
EC-No.	: 202-425-9
Index-No.	: 602-034-00-7

Hazardous components

Component	Classification	Concentration
1,2-Dichlorobenzene		
	Flam. Liq. 4; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H227, H302 + H332, H315, H317, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,2-Dichlorobenzene	95-50-1	TWA	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		STEL	50.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		STEL	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		C	50.000000 ppm 300.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.		
		C	50.000000 ppm 300.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 38 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -18 - -17 °C (0 - 1 °F) - lit. |
| f) Initial boiling point and boiling range | 178 - 180 °C (352 - 356 °F) - lit. |
| g) Flash point | 66.0 °C (150.8 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | Upper explosion limit: 9.2 %(V)
Lower explosion limit: 2.2 %(V) |
| k) Vapour pressure | 2.1 hPa (1.6 mmHg) at 35.0 °C (95.0 °F)
1.6 hPa (1.2 mmHg) at 20.0 °C (68.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.306 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | ca.0.1558 g/l at 25 °C (77 °F) - partly soluble |
| o) Partition coefficient: n-octanol/water | log Pow: ca.3.433 at 25 °C (77 °F) |
| p) Auto-ignition temperature | 648.0 °C (1,198.4 °F) |
| q) Decomposition | No data available |

temperature

- r) Viscosity No data available
- s) Explosive properties No data available
- t) Oxidizing properties No data available

9.2 Other safety information

Surface tension ca.36.61 mN/m

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 500.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - > 10,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

(OECD Test Guideline 404)

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

in vivo assay - Mouse

May cause sensitisation by skin contact.

(OECD Test Guideline 429)

Germ cell mutagenicity

No data available

Ames test

Salmonella typhimurium

Result: negative

OECD Test Guideline 474

Mouse - male - Bone marrow

Result: negative

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (1,2-Dichlorobenzene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard

No data available

Additional Information

Repeated dose toxicity Rat - male and female - Oral - 24 h - NOAEL : 60 mg/kg - LOAEL : 125 mg/kg - OECD Test Guideline 408
RTECS: CZ4500000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 1.58 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates static test EC50 - Ceriodaphnia dubia (water flea) - 0.66 mg/l - 48 h

Toxicity to algae Growth inhibition EC50 - Pseudokirchneriella subcapitata - 2.2 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: 0 % - Not readily biodegradable.
(OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation Cyprinus carpio (Carp) - 56 d
- 0.01 mg/l

Bioconcentration factor (BCF): 90 - 260
(OECD Test Guideline 305C)

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1591 Class: 6.1 Packing group: III
Proper shipping name: o-Dichlorobenzene
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1591 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: ortho-DICHLOROBENZENE
Marine pollutant: yes

IATA

UN number: 1591 Class: 6.1 Packing group: III
Proper shipping name: o-Dichlorobenzene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7

Revision Date: 11/26/2015

Print Date: 02/11/2016

Material Safety Data Sheet

Version 3.1

Revision Date 04/08/2011

Print Date 12/27/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1,3,5-Trimethylbenzene

Product Number : 442236

Brand : Supelco

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Combustible Liquid, Target Organ Effect, Irritant

Target Organs

Peripheral nervous system., Central nervous system, Blood

GHS Classification

Flammable liquids (Category 3)

Acute toxicity, Inhalation (Category 5)

Skin irritation (Category 2)

Eye irritation (Category 2B)

Specific target organ toxicity - single exposure (Category 3)

Acute aquatic toxicity (Category 2)

Chronic aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H226

Flammable liquid and vapour.

H315 + H320

Causes skin and eye irritation.

H333

May be harmful if inhaled.

H335

May cause respiratory irritation.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P273

Avoid release to the environment.

P305 + P351 + P338

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard: 2
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0

NFPA Rating

Health hazard: 2
Fire: 2
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Mesitylene
1,3,5-Trimethylbenzene

Formula : C₉H₁₂
Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Mesitylene			
108-67-8	203-604-4	601-025-00-5	-

4. FIRST AID MEASURES**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES**Suitable extinguishing media**

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
Mesitylene	108-67-8	TWA	25 ppm 125 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	25 ppm 123 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	25 ppm 125 mg/m3	USA. NIOSH Recommended Exposure Limits

Personal protective equipment**Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

impervious clothing, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form liquid, clear

Colour colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -45 °C (-49 °F) - lit.
Boiling point	163 - 166 °C (325 - 331 °F) - lit.
Flash point	53.0 °C (127.4 °F) - closed cup
Ignition temperature	550 °C (1,022 °F)
Autoignition temperature	550.0 °C (1,022.0 °F)
Lower explosion limit	0.88 %(V)
Vapour pressure	18.7 hPa (14.0 mmHg) at 55.0 °C (131.0 °F) 3.3 hPa (2.5 mmHg) at 25.0 °C (77.0 °F)
Density	0.864 g/cm ³ at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

Inhalation LC50

LC50 Inhalation - rat - 4 h - 24,000 mg/m³

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

Skin - rabbit - Skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: OX6825000

12. ECOLOGICAL INFORMATION**Toxicity**

Toxicity to fish	LC50 - Carassius auratus (goldfish) - 12.52 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 6 mg/l - 48 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

Toxic to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS**Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 2325 Class: 3 Packing group: III

Proper shipping name: 1,3,5-Trimethylbenzene

Marine pollutant: No

Poison Inhalation Hazard: No

IMDG

UN number: 2325 Class: 3 Packing group: III EMS-No: F-E, S-D

Proper shipping name: 1,3,5-TRIMETHYLBENZENE

Marine pollutant: No

IATA

UN number: 2325 Class: 3 Packing group: III

Proper shipping name: 1,3,5-Trimethylbenzene

15. REGULATORY INFORMATION**OSHA Hazards**

Combustible Liquid, Target Organ Effect, Irritant

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Mesitylene	108-67-8	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Mesitylene	108-67-8	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Mesitylene	108-67-8	1994-04-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Further information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

Version 4.6
Revision Date 03/03/2015
Print Date 03/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,3-Butadiene

Product Number : 295035
Brand : Aldrich
Index-No. : 601-013-00-X

CAS-No. : 106-99-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable gases (Category 1), H220
Gases under pressure (Liquefied gas), H280
Germ cell mutagenicity (Category 1B), H340
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H220 : Extremely flammable gas.
H280 : Contains gas under pressure; may explode if heated.
H340 : May cause genetic defects.
H350 : May cause cancer.

Precautionary statement(s)

P201 : Obtain special instructions before use.
P202 : Do not handle until all safety precautions have been read and understood.
P210 : Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P281 : Use personal protective equipment as required.

P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₄ H ₆
Molecular weight	: 54.09 g/mol
CAS-No.	: 106-99-0
EC-No.	: 203-450-8
Index-No.	: 601-013-00-X

Hazardous components

Component	Classification	Concentration
1,3-Butadiene		
	Flam. Gas 1; Press. Gas Liquefied gas; Muta. 1B; Carc. 1A; H220, H280, H340, H350	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Clean up promptly by sweeping or vacuum.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Contents under pressure. Air sensitive. Light sensitive. Shock or heat may detonate May explode when heated. Handle and store under inert gas.

Storage class (TRGS 510): Gases

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Potential Occupational Carcinogen See Appendix A		
1,3-Butadiene	106-99-0	TWA	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Cancer Suspected human carcinogen		
		TWA	2.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Cancer Suspected human carcinogen		
		TWA	1 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Substance listed; for more information see OSHA document 29 CFR 1910.1051; 29 CFR 1910.19(1)		
		TWA	1.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Substance listed; for more information see OSHA document 29 CFR 1910.1051; 29 CFR 1910.19(1)		

		STEL	5 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Substance listed; for more information see OSHA document 29 CFR 1910.1051; 29 CFR 1910.19(1)		
		STEL	5.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Substance listed; for more information see OSHA document 29 CFR 1910.1051; 29 CFR 1910.19(1)		
		See 1910.1051		
		PEL	1.000000 ppm	OSHA Specifically Regulated Chemicals/Carcinogens
		1910.1051 This section applies to all occupational exposures to 1,3-Butadiene (BD), Chemical Abstracts Service Registry No. 106-99-0, except as provided in paragraph (a)(2) of this section. Except for the recordkeeping provisions in paragraph (m)(1) of this section, this section does not apply to the processing, use, or handling of products containing BD or to other work operations and streams in which BD is present where objective data are reasonably relied upon that demonstrate the work operation or the product or the group of products or operations to which it belongs may not reasonably be foreseen to release BD in airborne concentrations at or above the action level or in excess of the STEL under the expected conditions of processing, use, or handling that will cause the greatest possible release or in any plausible accident. This section also does not apply to work operations, products or streams where the only exposure to BD is from liquid mixtures containing 0.1% or less of BD by volume or the vapors released from such liquids, unless objective data become available that show that airborne concentrations generated by such mixtures can exceed the action level or STEL under reasonably predictable conditions of processing, use or handling that will cause the greatest possible release. Except for labeling requirements and requirements for emergency response, this section does not apply to the storage, transportation, distribution or sale of BD or liquid mixtures in intact containers or in transportation pipelines sealed in such a manner as to fully contain BD vapors or liquid. Where products or processes containing BD are exempted under paragraph (a)(2) of this section, the employer shall maintain records of the objective data supporting that exemption and the basis for the employer's reliance on the data, as provided in paragraph (m)(1) of this section 1,3-Butadiene means an organic compound with chemical formula $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$ that has a molecular weight of approximately 54.15 g/mole OSHA specifically regulated carcinogen		
		STEL	5.000000 ppm	OSHA Specifically Regulated Chemicals/Carcinogens
		1910.1051 This section applies to all occupational exposures to 1,3-Butadiene (BD), Chemical Abstracts Service Registry No. 106-99-0, except as provided in paragraph (a)(2) of this section. Except for the recordkeeping provisions in paragraph (m)(1) of this section, this section does not apply to the processing, use, or handling of products containing BD or to other work operations and streams in which BD is present where objective data are reasonably relied upon that demonstrate the work operation or the product or the group of products or operations to which it belongs may not reasonably be foreseen to release BD in airborne concentrations at or above the		

		<p>action level or in excess of the STEL under the expected conditions of processing, use, or handling that will cause the greatest possible release or in any plausible accident. This section also does not apply to work operations, products or streams where the only exposure to BD is from liquid mixtures containing 0.1% or less of BD by volume or the vapors released from such liquids, unless objective data become available that show that airborne concentrations generated by such mixtures can exceed the action level or STEL under reasonably predictable conditions of processing, use or handling that will cause the greatest possible release. Except for labeling requirements and requirements for emergency response, this section does not apply to the storage, transportation, distribution or sale of BD or liquid mixtures in intact containers or in transportation pipelines sealed in such a manner as to fully contain BD vapors or liquid. Where products or processes containing BD are exempted under paragraph (a)(2) of this section, the employer shall maintain records of the objective data supporting that exemption and the basis for the employer's reliance on the data, as provided in paragraph (m)(1) of this section</p> <p>1,3-Butadiene means an organic compound with chemical formula $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$ that has a molecular weight of approximately 54.15 g/mole</p> <p>OSHA specifically regulated carcinogen</p>
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Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
1,3-Butadiene	106-99-0	1,2-Dihydroxy-4-(N-acetylcysteinyl)-butane	2.5000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Mixture of N-1 and N-2(hydroxybutenyl)valine	2.5pmol/g	Hemoglobin (Hb) adducts in blood	ACGIH - Biological Exposure Indices (BEI)
		Not critical			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: Liquefied gas |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -109 °C (-164 °F) - lit. |
| f) Initial boiling point and boiling range | -4.5 °C (23.9 °F) - lit. |
| g) Flash point | -75.99 °C (-104.78 °F) - closed cup - Tested according to Annex V of Directive 67/548/EEC. |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | Upper explosion limit: 16.3 %(V)
Lower explosion limit: 1.4 %(V) |
| k) Vapour pressure | ca.2,400 hPa (1,800 mmHg) at 20 °C (68 °F)
3,200 hPa (2,400 mmHg) at 30 °C (86 °F)
5,700 hPa (4,275 mmHg) at 50 °C (122 °F) |
| l) Vapour density | No data available |
| m) Relative density | 0.62 g/cm ³ at 20 °C (68 °F) |
| n) Water solubility | 0.5 g/l at 20 °C (68 °F) - Tested according to Annex V of Directive 67/548/EEC. |
| o) Partition coefficient: n-octanol/water | log Pow: 1.85 at 23 °C (73 °F) |
| p) Auto-ignition temperature | No data available |

- | | |
|------------------------------|-------------------|
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Test for peroxide formation before using or discard after 3 months.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Oxidizing agents, Oxygen, Copper, Copper alloys, Carbides, Halogens, Metal oxides, Metals

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 5,480 mg/kg

LC50 Inhalation - Rat - 4 h - 285 mg/l

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

In vivo tests showed mutagenic effects

Carcinogenicity

Carcinogenicity - Rat - Inhalation

Tumorigenic: Carcinogenic by RTECS criteria. Cardiac: Tumors. Lungs, Thorax, or Respiration: Tumors.

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Human carcinogen.

IARC: 1 - Group 1: Carcinogenic to humans (1,3-Butadiene)

NTP: Known to be human carcinogen (1,3-Butadiene)

OSHA: OSHA specifically regulated carcinogen (1,3-Butadiene)

Reproductive toxicity

No data available

Reproductive toxicity - Mouse - Inhalation

Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

No data available

Developmental Toxicity - Rat - Inhalation

Specific Developmental Abnormalities: Musculoskeletal system.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Cholinesterase inhibitors can cause heavy salivation and secretion in the lungs, lachrymation, blurred vision, involuntary defecation, diarrhea, tremor, ataxia, sweating, hypothermia, lowered heart rate, and/or a fall in blood pressure as a result of their action at cholinergic nerve sites., narcosis, Headache, Nausea, Vomiting, Dizziness, Drowsiness, Confusion., Weakness, Muscle cramps/spasms., Change in pupil size., Tremors, Seizures., Incoordination., Convulsions, Coma

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - other fish - 71.5 mg/l - 24 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1010 Class: 2.1
Proper shipping name: Butadienes, stabilized
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1010 Class: 2.1
Proper shipping name: BUTADIENES, STABILIZED

EMS-No: F-D, S-U

IATA

UN number: 1010 Class: 2.1
Proper shipping name: Butadienes, stabilized
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,3-Butadiene	106-99-0	1993-04-24

SARA 311/312 Hazards

Fire Hazard, Sudden Release of Pressure Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,3-Butadiene	106-99-0	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,3-Butadiene	106-99-0	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,3-Butadiene	106-99-0	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

1,3-Butadiene

CAS-No.	Revision Date
106-99-0	2007-09-28

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

1,3-Butadiene

CAS-No.	Revision Date
106-99-0	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Flam. Gas	Flammable gases
H220	Extremely flammable gas.

H280	Contains gas under pressure; may explode if heated.
H340	May cause genetic defects.
H350	May cause cancer.
Muta.	Germ cell mutagenicity
Press. Gas	Gases under pressure

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	3

NFPA Rating

Health hazard:	0
Fire Hazard:	4
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6

Revision Date: 03/03/2015

Print Date: 03/03/2016

SAFETY DATA SHEET

Version 4.7
Revision Date 06/18/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,3-Dichlorobenzene

Product Number : 113808
Brand : Aldrich
Index-No. : 602-067-00-7

CAS-No. : 541-73-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H227
H302
H411

Combustible liquid.
Harmful if swallowed.
Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210
P264
P270
P273
P280
P301 + P312 + P330

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.
Wear protective gloves/ eye protection/ face protection.
IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you

P370 + P378	feel unwell. Rinse mouth. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₆ H ₄ Cl ₂
Molecular weight	: 147.00 g/mol
CAS-No.	: 541-73-1
EC-No.	: 208-792-1
Index-No.	: 602-067-00-7

Hazardous components

Component	Classification	Concentration
1,3-Dichlorobenzene		
	Flam. Liq. 4; Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H227, H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 37 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -25 - -22 °C (-13 - -8 °F) - lit. |
| f) Initial boiling point and boiling range | 172 - 173 °C (342 - 343 °F) - lit. |
| g) Flash point | 67.0 °C (152.6 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 1.288 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | log Pow: 5 |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |

t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - 1,062 mg/kg

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (1,3-Dichlorobenzene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CZ4499000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 7.8 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates LC50 - Daphnia magna (Water flea) - 1.7 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 32 d
- 0.3 mg/l

Bioconcentration factor (BCF): 97

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (1,3-Dichlorobenzene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,3-Dichlorobenzene)
Marine pollutant: yes

IATA

UN number: 3082 Class: 9 Packing group: III

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H302	Harmful if swallowed.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7

Revision Date: 06/18/2015

Print Date: 02/09/2016

SAFETY DATA SHEET

Version 4.4
Revision Date 04/24/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,4-Dichlorobenzene

Product Number : D56829
Brand : Aldrich
Index-No. : 602-035-00-2

CAS-No. : 106-46-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.

P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₆ H ₄ Cl ₂
Molecular weight	: 147.00 g/mol
CAS-No.	: 106-46-7
EC-No.	: 203-400-5
Index-No.	: 602-035-00-2

Hazardous components

Component	Classification	Concentration
1,4-Dichlorobenzene		
	Eye Irrit. 2A; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H319, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,4-Dichlorobenzene	106-46-7	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen See Appendix A		
		TWA	75.000000 ppm 450.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: sheets
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 52 - 54 °C (126 - 129 °F) - lit. |
| f) Initial boiling point and boiling range | 173 °C (343 °F) - lit. |
| g) Flash point | 66.0 °C (150.8 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 8.8 hPa (6.6 mmHg) at 50.0 °C (122.0 °F)
0.5 hPa (0.4 mmHg) at 25.0 °C (77.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.241 g/mL at 25 °C (77 °F) |
| n) Water solubility | No data available |

- | | |
|---|-------------------|
| o) Partition coefficient: n-octanol/water | log Pow: 3.40 |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

Bulk density	650 kg/m ³
--------------	-----------------------

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD₀ Oral - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 401)

LC₅₀ Inhalation - Rat - male and female - 4 h - > 5.07 mg/l

LD₀ Dermal - Rat - > 2,000 mg/kg
(OECD Test Guideline 402)

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig
Did not cause sensitisation on laboratory animals.
(OECD Test Guideline 406)

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (1,4-Dichlorobenzene)

NTP: Reasonably anticipated to be a human carcinogen (1,4-Dichlorobenzene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CZ4550000

Produces:, methemoglobin, Nausea, Vomiting, Increased pulse rate, Headache, Impairment of vision

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish flow-through test LC50 - *Salmo gairdneri* - 1.12 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates static test EC50 - *Daphnia magna* (Water flea) - 0.7 mg/l - 48 h

Toxicity to algae Growth inhibition EC50 - *Scenedesmus capricornutum* (fresh water algae) - 1.6 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: 30 % - Not rapidly biodegradable
(OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation *Jordanella floridae* - 5 d
- 2.68 µg/l

Bioconcentration factor (BCF): 296

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (1,4-Dichlorobenzene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (1,4-Dichlorobenzene)
Marine pollutant: yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (1,4-Dichlorobenzene)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.4

Revision Date: 04/24/2015

Print Date: 01/29/2016

SAFETY DATA SHEET

Version 5.4
Revision Date 11/03/2015
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : 2,2,4-Trimethylpentane

Product Number : 360597
Brand : Sigma-Aldrich
Index-No. : 601-009-00-8

CAS-No. : 540-84-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H225 : Highly flammable liquid and vapour.
H304 : May be fatal if swallowed and enters airways.
H315 : Causes skin irritation.
H336 : May cause drowsiness or dizziness.
H410 : Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210 : Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P321	Specific treatment (see supplemental first aid instructions on this label).
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: Isooctane
Formula	: C ₈ H ₁₈
Molecular weight	: 114.23 g/mol
CAS-No.	: 540-84-1
EC-No.	: 208-759-1
Index-No.	: 601-009-00-8
Registration number	: 01-2119457965-22-XXXX

Hazardous components

Component	Classification	Concentration
2,2,4-Trimethylpentane		
	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 1; Aquatic Chronic 1; H225, H304, H315, H336, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Nature of decomposition products not known.

Carbon oxides

Flash back possible over considerable distance., Container explosion may occur under fire conditions.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
2,2,4-Trimethylpentane	540-84-1	TWA	300.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 482 min

Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 90 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: liquid
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: -107 °C (-161 °F)
f) Initial boiling point and boiling range	98 - 99 °C (208 - 210 °F)
g) Flash point	-12 °C (10 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 6 %(V) Lower explosion limit: 1 %(V)
k) Vapour pressure	55 hPa (41 mmHg) at 21 °C (70 °F) 117 hPa (88 mmHg) at 37.80 °C (100.04 °F)
l) Vapour density	3.94 - (Air = 1.0)
m) Relative density	0.692 g/mL at 25 °C (77 °F)
n) Water solubility	insoluble
o) Partition coefficient: n-octanol/water	log Pow: 4.6
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density 3.94 - (Air = 1.0)

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - > 5,000 mg/kg

(OECD Test Guideline 401)

LC50 Inhalation - Rat - 4 h - > 33.52 mg/l

(OECD Test Guideline 403)

LD50 Dermal - Rabbit - > 2,000 mg/kg

(OECD Test Guideline 402)

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Irritating to skin.

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Rat

Unscheduled DNA synthesis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Additional Information

RTECS: SA3320000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential**12.4 Mobility in soil**

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1262 Class: 3

Packing group: II

Proper shipping name: Octanes

Reportable Quantity (RQ): 1000 lbs

Marine pollutant:yes

Poison Inhalation Hazard: No

IMDG

UN number: 1262 Class: 3

Packing group: II

EMS-No: F-E, S-E

Proper shipping name: OCTANES

Marine pollutant:yes

IATA

UN number: 1262 Class: 3

Packing group: II

Proper shipping name: Octanes

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

2,2,4-Trimethylpentane

CAS-No.
540-84-1Revision Date
2007-03-01**Pennsylvania Right To Know Components**

2,2,4-Trimethylpentane

CAS-No.
540-84-1Revision Date
2007-03-01**New Jersey Right To Know Components**

2,2,4-Trimethylpentane

CAS-No.
540-84-1Revision Date
2007-03-01**California Prop. 65 Components**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4

Revision Date: 11/03/2015

Print Date: 04/01/2016

MATERIAL SAFETY DATA SHEET

Date Printed: 05/24/2004

Date Updated: 03/10/2004

Version 1.5

Section 1 - Product and Company Information

Product Name	2-BUTANONE, 99.5+%, HPLC GRADE
Product Number	270695
Brand	ALDRICH
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS MO 63103 US
Technical Phone:	314 771 5765
Emergency Phone:	414 273 3850 Ext. 5996
Fax:	800 325 5052

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
2-BUTANONE	78-93-3	Yes
Formula	C4H8O	
Synonyms	Acetone, methyl- * Aethylmethyleketon (German) * Butanone * 2-Butanone (OSHA) * Butanone 2 (French) * 3-Butanone * Ethyl methyl cetone (French) * Ethylmethyleketon (Dutch) * Ketone, ethyl methyl * Meetco * MEK (OSHA) * Methyl acetone * Methyl ethyl ketone (ACGIH:OSHA) * Metiletilchetone (Italian) * Metyloetyloketon (Polish) * RCRA waste number U159	
RTECS Number:	EL6475000	

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Irritant.
Irritating to respiratory system and skin. Risk of serious damage
to eyes. Vapors may cause drowsiness and dizziness.
Target organ(s): Central nervous system.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 1

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS

Flammable Hazards: Yes

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT

30 °F -1 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1.8 % Upper: 10.1 %

AUTOIGNITION TEMP

516 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Bulk Density	N/A	
Odor Threshold	5.4 - 1 ppm	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	0.4 Pas	25 °C
Surface Tension	24.6 mN/m	20 °C
Partition Coefficient	Log Kow: 0.29	
Decomposition Temp.	N/A	
Flash Point	30 °F -1 °C	Method: closed cup
Explosion Limits	Lower: 1.8 % Upper: 10.1 %	
Flammability	N/A	
Autoignition Temp	516 °C	
Refractive Index	1.379	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:soluble Other Solvents: ALCOHOL, ETHER, ACETONE BENZENE	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions to Avoid: Protect from moisture.

Materials to Avoid: Oxidizing agents, Strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes severe eye irritation.

Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Central nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE

Can cause CNS depression. Exposure can cause: Gastrointestinal disturbances. Narcotic effect.

TOXICITY DATA

Oral

Rat

2737 mg/kg

LD50

Inhalation
Rat
23,500 mg/m3
LC50

Intraperitoneal
Rat
607 MG/KG
LD50

Oral
Mouse
4050 mg/kg
LD50

Inhalation
Mouse
32,000 mg/m3
LC50

Intraperitoneal
Mouse
616 MG/KG
LD50

Skin
Rabbit
6480 mg/kg
LD50

Inhalation
Mammal
38,000 mg/m3
LC50

IRRITATION DATA

Eyes
Human
350 ppm

Skin
Rabbit
500 mg
24H
Remarks: Moderate irritation effect

Skin
Rabbit
402 mg
24H
Remarks: Mild irritation effect

Skin
Rabbit
13.78 mg
24H
Remarks: Open irritation test

Eyes
Rabbit
80 mg

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 3000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Urogenital system. Specific Developmental Abnormalities: Homeostasis

Species: Rat
Dose: 1000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 3000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 7,060 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: 4,600 - 4,880 mg/l

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 3,130 - 3,320 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Ethyl methyl ketone [or] Methyl ethyl ketone
UN#: 1193
Class: 3

Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Methyl ethyl ketone
IATA UN Number: 1193
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: F Xi
Indication of Danger: Highly Flammable. Irritant.
R: 11 36 66 67
Risk Statements: Highly flammable. Irritating to eyes. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.
S: 9 16
Safety Statements: Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU). Irritant.
Risk Statements: Irritating to respiratory system and skin. Risk of serious damage to eyes. Vapors may cause drowsiness and dizziness.
Safety Statements: Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.
US Statements: Target organ(s): Central nervous system.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

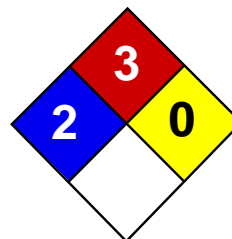
DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

2-Hexanone MSDS

Section 1: Chemical Product and Company Identification

Product Name: 2-Hexanone

Catalog Codes: SLH2950

CAS#: 591-78-6

RTECS: MP1400000

TSCA: TSCA 8(b) inventory: 2-Hexanone

CI#: Not available.

Synonym: Methyl butyl ketone

Chemical Formula: C₆H₁₂O

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{2-}Hexanone	591-78-6	100

Toxicological Data on Ingredients: 2-Hexanone: ORAL (LD50): Acute: 2590 mg/kg [Rat]. 2430 mg/kg [Mouse]. DERMAL (LD50): Acute: 4860 mg/kg [Rabbit]. VAPOR (LC50): Acute: 8000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation (lung irritant). Hazardous in case of skin contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (permeator). Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 533°C (991.4°F)

Flash Points: CLOSED CUP: 23°C (73.4°F). OPEN CUP: 28°C (82.4°F) (TAG).

Flammable Limits: LOWER: 1.2% UPPER: 8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 CEIL: 40 (ppm) TWA: 100 CEIL: 165 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 100.16 g/mole

Color: Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 127.5°C (261.5°F)

Melting Point: -56.9°C (-70.4°F)

Critical Temperature: Not available.

Specific Gravity: 0.8113 (Water = 1)

Vapor Pressure: 12 mm of Hg (@ 20°C)

Vapor Density: 3.45 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.18 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, acetone.

Solubility:

Easily soluble in acetone. Partially soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2430 mg/kg [Mouse]. Acute dermal toxicity (LD50): 4860 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 8000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Very hazardous in case of inhalation (lung irritant). Hazardous in case of skin contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Testicular damage in animal.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Ketone Liquid, n.o.s.(2-Hexanone) : UN1224 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: 2-Hexanone Pennsylvania RTK: 2-Hexanone Florida: 2-Hexanone Massachusetts RTK: 2-Hexanone New Jersey: 2-Hexanone TSCA 8(b) inventory: 2-Hexanone

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).

DSCL (EEC):

R10- Flammable. R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:43 PM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

1. Identification

Product Name p-Cymene

Cat No. : AC111760000; AC111760010; AC111760025; AC111760100;
AC111762500

Synonyms Dolcymene; p-Isopropyltoluene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company	Entity / Business Name	Emergency Telephone Number
Fisher Scientific	Acros Organics	For information US call: 001-800-ACROS-01
One Reagent Lane	One Reagent Lane	/ Europe call: +32 14 57 52 11
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410	Emergency Number US :001-201-796-7100 /
Tel: (201) 796-7100		Europe : +32 14 57 52 99
		CHEMTREC Tel. No. US :001-800-424-9300 /
		Europe :001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word

Danger

Hazard Statements

Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell

Skin

If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
p-Cymene	99-87-6	>95

4. First-aid measures

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

Skin Contact

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation

Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If

	not breathing, give artificial respiration. Obtain medical attention.
Ingestion	Do not induce vomiting. Clean mouth with water. Get medical attention.
Most important symptoms/effects	Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO ₂). Dry chemical. Use water spray to cool unopened containers. chemical foam.
Unsuitable Extinguishing Media	No information available
Flash Point	47 °C / 116.6 °F
Method -	No information available
Autoignition Temperature	435 °C / 815 °F
Explosion Limits	
Upper	5.60%
Lower	.70%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Flammable. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO₂)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions	See Section 12 for additional ecological information.
Methods for Containment and Clean Up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling	Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Take precautionary measures against static discharges. Use explosion-proof equipment. Use only non-sparking tools.
Storage	Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
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Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-68 °C / -90.4 °F
Boiling Point/Range	176 - 178 °C / 348.8 - 352.4 °F @ 760 mmHg
Flash Point	47 °C / 116.6 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	5.60%
Lower	.70%
Vapor Pressure	1.5 mmHg @ 20 °C
Vapor Density	4.62 (Air = 1.0)
Relative Density	0.854
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	435 °C / 815 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C10 H14
Molecular Weight	134.22

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products.
Incompatible Materials	Strong oxidizing agents, Strong acids, Strong bases
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
p-Cymene	3669 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
p-Cymene	99-87-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
p-Cymene	Not listed	LC50: 48 mg/L/96h (sheepshead minnow)	Not listed	LC50: 6.5 mg/L/48h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility

Component	log Pow
p-Cymene	4.1

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2046
Hazard Class 3
Packing Group III

TDG

UN-No UN2046
Hazard Class 3
Packing Group III

IATA

UN-No 2046
Proper Shipping Name CYMENES
Hazard Class 3
Packing Group III

IMDG/IMO

UN-No 2046
Proper Shipping Name CYMENES
Hazard Class 3
Packing Group III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
p-Cymene	X	X	-	202-796-7	-		X	X	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

Not applicable

California Proposition 65

This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
p-Cymene	X	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade**

No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

B2 Flammable liquid
D2B Toxic materials

**16. Other information****Prepared By**

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date

10-Feb-2015

Print Date

10-Feb-2015

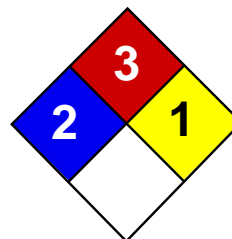
Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Methyl isobutyl ketone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Methyl isobutyl ketone

Catalog Codes: SLM3412

CAS#: 108-10-1

RTECS: SA9275000

TSCA: TSCA 8(b) inventory: Methyl isobutyl ketone

CI#: Not available.

Synonym: 4-Methyl-2-pentanone

Chemical Formula: C₆H₁₂O

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Methyl isobutyl ketone	108-10-1	100

Toxicological Data on Ingredients: Methyl isobutyl ketone: ORAL (LD50): Acute: 1600 mg/kg [Guinea pig]. 2671 mg/kg [Mouse]. 2080 mg/kg [Rat]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit]. VAPOR (LC50): Acute: 8000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (irritant, permeator). Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 460°C (860°F)

Flash Points: CLOSED CUP: 14°C (57.2°F). OPEN CUP: 23°C (73.4°F).

Flammable Limits: LOWER: 1.4% UPPER: 7.5%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 50 STEL: 75 CEIL: 125 (ppm) from ACGIH (TLV) [1995] TWA: 205 STEL: 300 CEIL: 510 (mg/m³) from ACGIH [1995]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 100.16 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 115.9°C (240.6°F)

Melting Point: -84°C (-119.2°F)

Critical Temperature: Not available.

Specific Gravity: 0.802 (Water = 1)

Vapor Pressure: 15.7 mm of Hg (@ 20°C)

Vapor Density: 3.45 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.1 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Partially soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Not available.

Special Remarks on Reactivity: Forms explosive peroxides on prolonged storage.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 1600 mg/kg [Guinea pig]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 8000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Methyl isobutyl ketone : UN1245 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Methyl isobutyl ketone Massachusetts RTK: Methyl isobutyl ketone TSCA 8(b) inventory: Methyl isobutyl ketone SARA 313 toxic chemical notification and release reporting: Methyl isobutyl ketone CERCLA: Hazardous substances.: Methyl isobutyl ketone

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).

DSCL (EEC):

R11- Highly flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

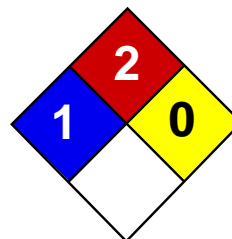
References: Not available.

Other Special Considerations: Not available.

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Health	1
Fire	2
Reactivity	0
Personal Protection	J

Material Safety Data Sheet Acetophenone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetophenone

Catalog Codes: SLA2425

CAS#: 98-86-2

RTECS: AM5250000

TSCA: TSCA 8(b) inventory: Acetophenone

CI#: Not applicable.

Synonym: Ketone methyl phenyl

Chemical Name: 1-Phenyl-ethanone

Chemical Formula: C₆H₅COCH₃

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetophenone	98-86-2	100

Toxicological Data on Ingredients: Acetophenone: ORAL (LD50): Acute: 815 mg/kg [Rat.]. 740 mg/kg [Mouse]. DERMAL (LD50): Acute: 15900 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Combustible.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: CLOSED CUP: 77°C (170.6°F). OPEN CUP: 82.2°C (180°F) (Cleveland).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Store away from direct sunlight. When heated to decomposition it emits acrid smoke and fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Combustible material. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, alkalis.

Storage:

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 120.16 g/mole

Color: Colorless to light yellow.

pH (1% soln/water): 7 [Neutral.]

Boiling Point: 201.7°C (395.1°F)

Melting Point: 19.7°C (67.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.03 (Water = 1)

Vapor Pressure: 0.1 kPa (@ 20°C)

Vapor Density: 4.1 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:

Soluble in methanol, diethyl ether. Partially soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:

Acute oral toxicity (LD50): 740 mg/kg [Mouse]. Acute dermal toxicity (LD50): 15900 mg/kg [Rabbit].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: 0900 Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans:

Material is irritating to mucous membranes and upper respiratory tract. Narcotic in high concentrations. Hypnotic.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 3: Combustible liquid

Identification: : FLAMMABLE LIQUIDS, N.O.S. UNNA: UN1993 PG: Not available.

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Acetophenone Massachusetts RTK: Acetophenone TSCA 8(b) inventory: Acetophenone SARA 313 toxic chemical notification and release reporting: Acetophenone CERCLA: Hazardous substances.: Acetophenone

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 2

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

Other Special Considerations: Not available.

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SAFETY DATA SHEET

Version 4.8

Revision Date 05/03/2017

Print Date 07/13/2017

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α -Chlordane

Product Number : 442449

Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302

Acute toxicity, Inhalation (Category 4), H332

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2), H351

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 + H332

Harmful if swallowed or if inhaled

H315

Causes skin irritation.

H319

Causes serious eye irritation.

H335

May cause respiratory irritation.

H351

Suspected of causing cancer.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight	: 409.8 g/mol
EC-No.	: 225-825-5

Hazardous components

Component	Classification	Concentration
Chlordane		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H302 + H332, H315, H319, H335, H351, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|---|
| a) Appearance | Form: crystalline
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | 93.0 - 94.0 °C (199.4 - 201.2 °F) |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |

- | | |
|---|-------------------|
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | No data available |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | No data available |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 500 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chlordane)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - Lepomis macrochirus (Bluegill) - 0.0074 mg/l - 96 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Lepomis macrochirus (Bluegill) - 24 h
- 0.005 mg/l

Bioconcentration factor (BCF): 322

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chlordane)
Reportable Quantity (RQ): Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chlordane)
Marine pollutant:yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chlordane)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

	CAS-No.	Revision Date
Chlordane	5103-71-9	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8

Revision Date: 05/03/2017

Print Date: 07/13/2017



SAFETY DATA SHEET

1. Identification

Product identifier	ATOMIZED ALUMINUM POWDER
Other means of identification	
SDS number	123
Chemical formula	Al
Version #	08
Revision date	August 11, 2015.
Other means of identification	
Synonyms	All non-alloyed, non-coated nodular aluminum powder containing < 1% trace elements * Grade 13, 101, 102, 104, 101T, 120, 121, 123, 1124, 1202, 1233, 1235, 1401/S2(1406), 1403, 1404, 1407, 1401/S9(1409), 1125, * 4402, 6401, 7123, 7124, 7125, 7401
Recommended use	Various metallurgical/chemical/structural/coating applications
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Manufacturer	Alcoa Inc. 201 Isabella Street Pittsburgh, PA USA 15212 Health and Safety Tel: +1-412-553-4649 Health and Safety Fax: +1-412-553-4822 Health and Safety Email: accmsds@alcoa.com Alcoa Inc. Rockdale Operations P.O. Box 472 Rockdale, TX 76567 Tel: +1-512-446-8681 Poços de Caldas Rodovia Poços de Caldas/Andradas, km 10 CEP 37.719-900 Poços de Caldas, Minas Gerais Tel.: (+55 35) 2101-5000 E-mail: pfacomercialprimarios@alcoa.com.br
Emergency Information	CHEMTREC: +1-703-527-3887 +1-800-424-9300 (24 Hour Emergency Telephone, multiple languages spoken); ALCOA: +1-412-553-4001 (24 Hour Emergency Telephone, only English spoken)
Website	For a current Safety Data Sheet, refer to Alcoa websites: www.alcoa.com or internally at my.alcoa.com EHS Community

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
Environmental hazards	Not classified.
Authority defined hazards	Combustible dust
Label elements	
Hazard symbol	None.
Signal word	Warning
Hazard statement	May form combustible dust concentrations in air.

Precautionary statement

Prevention

Care should be taken during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Use only non-sparking tools and natural bristle brushes. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Prevent dust accumulation to minimize explosion hazard. Take precautionary measures against static discharge.

Response

In case of fire: Use appropriate media for extinction.

Storage

Store in a dry place and/or in closed container. Keep away from heat, sparks and open flame - No smoking. Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

Disposal

Reuse or recycle material whenever possible. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal.

Hazard(s) not otherwise classified (HNOC)

None known.

Supplemental information

Powder may ignite readily. Powder or dusts dispersed in the air can be explosive.

Explosion/fire hazards may be present when:

- Powder or dust are dispersed in air.
- Powder or dusts are in contact with water.
- Powder or dusts are in contact with certain metal oxides (e.g., rust, copper oxide).

3. Composition/information on ingredients

Composition comments

Complete composition is provided below and may include some components classified as non-hazardous.

Substances

Chemical name	Common name and synonyms	CAS number	%
Aluminum powder		7429-90-5	≥99.7

4. First-aid measures

Eye contact

Dust from processing: Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

Skin contact

Dust from processing: Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Inhalation

Dust from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

Ingestion

If swallowed, dilute by drinking water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Consult a physician.

Most important symptoms/effects, acute and delayed

Dust from processing: Can cause irritation of the upper respiratory tract. See Section 11 of the SDS for additional information on health hazards.

Medical conditions aggravated by exposure

Asthma, chronic lung disease, and skin rashes.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen.

General information

If exposed or concerned: Get medical advice/attention. In case of shortness of breath, give oxygen.

5. Fire-fighting measures

Suitable extinguishing media

Use Class D extinguishing agents on fines, dust or molten metal.

Unsuitable extinguishing media

DO NOT USE water, halogenated agents, or ABC dry chemical agents. These fire extinguishing agents will react with the burning material.

Specific hazards arising from the chemical	<p>Alcoa aluminum powders were tested by the United States Department of Interior Bureau of Mines in 1991, under UN criteria and found not to meet the definition of a hazard class 4. Care should be taken, however, during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles.</p> <p>May be a potential hazard under the following conditions:</p> <ul style="list-style-type: none"> • Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. • Powder or dusts in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces. • Powder or dusts are in contact with certain metal oxides (e.g., rust, copper oxide).
Special protective equipment and precautions for firefighters	Firefighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.
Fire fighting equipment/instructions	Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. Avoid mixing of the extinguishing agent with the burning material. Apply extinguishing media carefully to avoid creating airborne dust. Do not disturb the material until completely cool. If possible, isolate the burning material to prevent fire spread, and allow the material to burn itself out. Move undamaged containers away from heat or flame, if possible.
General fire hazards	Dust and fines from processing may ignite readily. Dust or fines dispersed in the air can be explosive.
Explosion data	
Sensitivity to mechanical impact	Not sensitive.
Sensitivity to static discharge	<p>Static electricity and formation of sparks must be prevented. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations.</p> <p>Obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) Standards listed in Section 16.</p> <p>Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).</p>

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Avoid contact with skin and eyes. Use personal protection recommended in Section 8 of the SDS.
Personal precautions, protective equipment and emergency procedures	
For emergency responders	Avoid contact with skin and eyes. Use personal protection recommended in Section 8 of the SDS.
Evacuation procedures	Keep people away from and upwind of spill/leak. Keep unnecessary personnel away.
Methods and materials for containment and cleaning up	<p>Isolate area. Avoid the generation of dusts during clean-up. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Use only non-sparking tools and natural bristle brushes. Use dry cleanup procedures.</p> <p>Keep material dry. Place carefully in dry, water-tight containers. Seal containers. After complete clean-up by sweeping, area may be washed with large amounts of water if necessary. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal. For waste disposal, see section 13 of the SDS.</p>
Environmental precautions	No specific precautions.

7. Handling and storage

Handling	Keep away from sources of ignition - No smoking. Avoid contact with skin and eyes. Care should be taken during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Keep material dry.
Storage	Keep dry. Storage rooms must be of fire-resistant construction. Do not store powder in same room as other combustible materials.

Requirements for Processes Which Generate Dusts or Fines

Obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin TR-2 and National Fire Protection Association (NFPA) brochures listed in Section 16. Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Process equipment, storage containers, vessels and buildings should be equipped with explosion/pressure relief valves, panels and windows. Precautions must also be taken to prevent water leakage or seepage which could contact the powder. Refer to NFPA 484.

Avoid all ignition sources. Good housekeeping practices must be maintained. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. Do not use compressed air to remove settled material from floors, beams or equipment. Do not allow fines or dust to contact water, particularly in enclosed areas.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA

Components

Type	Value	Form
Aluminum powder (CAS 7429-90-5)	TWA	15 mg/m3 (total dust)

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value	Form
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ATOMIZED ALUMINUM POWDER	PEL	5 mg/m3	Respirable dust.
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Components	Type	Value	Form
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Aluminum powder (CAS 7429-90-5)	TWA	5 mg/m3	Respirable dust.
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US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units

Material	Type	Value	Form
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ATOMIZED ALUMINUM POWDER	TWA	1 mg/m3	Respirable fraction.
--------------------------	-----	---------	----------------------

Components	Type	Value	Form
------------	------	-------	------

Aluminum powder (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
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Alcoa

Material

Type	Value	Form
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ATOMIZED ALUMINUM POWDER	TWA	3 mg/m3	Respirable fraction
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Components	Type	Value	Form
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Aluminum powder (CAS 7429-90-5)	TWA	3 mg/m3	Respirable fraction
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10 mg/m3	Total dust
----------	------------

General

Use personal protective equipment as required.

Appropriate engineering controls

Dust from processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields.

Skin protection

Hand protection

Wear impervious gloves to avoid direct skin contact.

Other	Recommend fire resistant cotton or equivalent full-length fire resistant pants and jackets along with electrically conductive safety shoes or grounding straps. Great caution is required to avoid contact with unprotected electrical devices when wearing conductive safety shoes or grounding straps.
Respiratory protection	Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8. Suggested respiratory protection: N95.
Thermal hazards	Not applicable.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.
Control parameters	

9. Physical and chemical properties

Form	Solid, powder.
Color	Silvery to gray.
Odor	Odorless
Odor threshold	Not applicable
pH	Not applicable
Density	0.80 - 1.30 g/cm ³
Melting point/freezing point	1194.8 - 1214.6 °F (646 - 657 °C) 1220 °F (660 °C)
Initial boiling point and boiling range	Not determined 4220.6 °F (2327 °C)
Flash point	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - upper (%)	Not determined
Flammability limit - lower (%)	40 mg/l
Explosive properties	Dust can form an explosive mixture in air. Dust accumulation from this product may present an explosion hazard in the presence of an ignition source.
Dust explosion properties	
St class	Very strong explosion.
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not determined
Solubility(ies)	Insoluble Insoluble
Partition coefficient (n-octanol/water)	Not applicable. Not applicable
Auto-ignition temperature	1202 °F (650 °C) layered
Decomposition temperature	Not applicable
Viscosity	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal conditions of use, storage, and transportation as shipped.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	<ul style="list-style-type: none"> • Water: Slowly generates flammable and explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Water/aluminum mixtures may be hazardous when confined. • Heat: Oxidizes at a rate dependent upon temperature and particle size.

Incompatible materials

- Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
- Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.
- Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum.
- Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation.
- Iron powder and water: Explosive reaction forming hydrogen gas when heated above 1470°F (800°C).

Hazardous decomposition products

No hazardous decomposition products are known.

11. Toxicological information**Health effects associated with ingredients**

Aluminum dust/fines and fumes: Low health risk by inhalation. Generally considered to be biologically inert.

Health effects associated with compounds formed during processing

No new/additional compounds are expected to be formed during processing.

Information on likely routes of exposure

Eye contact	Can cause mechanical irritation.
Skin contact	Dust from processing: Can cause mechanical irritation.
Inhalation	Dust from processing: Can cause irritation of the upper respiratory tract.
Ingestion	Can cause irritation of the gastrointestinal tract.

Symptoms related to the physical, chemical and toxicological characteristics

Dust from processing: Can cause mechanical irritation. Dust: Can cause irritation of the upper respiratory tract.

Information on toxicological effects

Acute toxicity	Based on available data, the classification criteria are not met.
Skin corrosion/irritation	Non-corrosive.
Serious eye damage/eye irritation	Can cause mechanical irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	Not a skin sensitizer.

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Neurological effects Based on available data, the classification criteria are not met.

Pre-existing conditions aggravated by exposure Asthma, chronic lung disease, and skin rashes.

Carcinogenicity Does not present any cancer hazards.

Reproductive toxicity Does not present any reproductive hazards.

Routes of exposure Inhalation. Skin contact. Eye contact.

Specific target organ toxicity - single exposure Based on available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure Based on available data, the classification criteria are not met.

Aspiration hazard Not an aspiration hazard.

Chronic effects Not classified.

Further information None known.

12. Ecological information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Product	Species	Test Results
ATOMIZED ALUMINUM POWDER		
Aquatic		
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)
		0.16 mg/l, 96 hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product does not contain any substances expected to be bioaccumulating.	
Mobility in soil	Not considered mobile.	
Mobility in general	Not considered mobile.	
Other adverse effects	Not available.	

13. Disposal considerations

Disposal instructions	Reuse or recycle material whenever possible. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Waste codes	RCRA Status: Not federally regulated in the U.S. if disposed of "as is." RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 261 or state equivalent in the U.S.
Waste from residues / unused products	If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.
Contaminated packaging	Dispose of in accordance with local regulations.

14. Transport information

General Shipping Information

Basic Shipping Information

ID number	-
Proper shipping name	Not regulated
Hazard class	-
Packing group	-

General Shipping Notes

- This material has been tested under UN criteria and found not to meet the definition of a hazard class 4 and does not meet the definition of any other hazard class.
- Standard Transportation Commodity Code: 33-991-19.
- HTS (Harmonized Tariff Schedule) code: 7603.10.0000.
- The import/export HTS (Harmonized Tariff Schedule) code given above is the United States HTS code provided by Alcoa's Customs Compliance Office in Knoxville, TN. Other country specific HTS codes may apply. If available, more information on the HTS codes will be provided on country specific Material Safety Data Sheets.
- When "Not regulated", enter the proper freight classification, SDS Number and Product Name onto the shipping paperwork.

Disclaimer

This section provides basic classification information and, where relevant, information with respect to specific modal regulations, environmental hazards and special precautions. Otherwise, it is presumed that the information is not available/not relevant

15. Regulatory information

US federal regulations	In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals. All electrical equipment must be suitable for use in hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installation which will meet this requirement.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated.
CERCLA Hazardous Substance List (40 CFR 302.4)	Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - Yes If dust clouds are generated
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum powder	7429-90-5	≥99.7

US state regulations**US. California Proposition 65**

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision**SDS Status**

August 11, 2015: Change(s) in Section: 1 and 16.
April 30, 2015 (April 30, 2015 Minor modification 0123usa): Change(s) in Section: 1, 2 Minor modification..
January 7, 2015: Change(s) in Section: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16.

Origination date: September 17, 1980

Hazardous Materials Control Committee
Preparer: Jim Perriello, +1-865-977-2051.

SDS System Number: 145308

Revision date

August 11, 2015.

Version #

08

Revision Information

Product and Company Identification: Synonyms
Composition / Information on Ingredients: Disclosure Overrides
Physical & Chemical Properties: Multiple Properties
Transport Information: Agency Name, Packaging Type, and Transport Mode Selection
Regulatory Information: United States
HazReg Data: North America
GHS: Classification

Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.

Other information

- Aluminum Association Bulletin TR-2, "Recommendations for Storage and Handling of Aluminum Pigments and Powders." The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
- Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
- NFPA 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
- NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
- NFPA 77, Standard for Static Electricity
- NFPA 68, Standard on Explosion Protection by Deflagration Venting • NFPA 69, Standard on Explosion Prevention Systems

Key/Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EC	Effective Concentration
ED	Effective Dose
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Japan - Existing and New Chemical Substances
EWC	European Waste Catalogue
EPA	Environmental Protective Agency
IARC	International Agency for Research on Cancer
LC	Lethal Concentration
LD	Lethal Dose
MAK	Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL	Non-Domestic Substances List (Canada)
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PIN	Product Identification Number
PMCC	Pensky Marten Closed Cup
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SIMDUT	Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System
m	meter, cm centimeter, mm millimeter, in inch,
g	gram, kg kilogram, lb pound, µg microgram,
ppm	parts per million, ft feet

*** End of SDS ***

Hazard statement

May form combustible dust concentrations in air.

Precautionary statement

Prevention

Care should be taken during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Use only non-sparking tools and natural bristle brushes. Keep away from heat/sparks/open flames/hot surfaces - No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Prevent dust accumulation to minimize explosion hazard. Take precautionary measures against static discharge.

Response

In case of fire: Use appropriate media for extinction.

Storage

Store in a dry place and/or in closed container. Keep away from heat, sparks and open flame - No smoking. Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

Disposal

Reuse or recycle material whenever possible. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal.

Warning

Supplemental information

Powder may ignite readily. Powder or dusts dispersed in the air can be explosive.

Explosion/fire hazards may be present when:

- Powder or dust are dispersed in air.
- Powder or dusts are in contact with water.
- Powder or dusts are in contact with certain metal oxides (e.g., rust, copper oxide).

FIRE FIGHTING MEASURES: Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. Avoid mixing of the extinguishing agent with the burning material. If possible, isolate the burning material to prevent fire spread, and allow the material to burn itself out. Do not disturb the material until completely cool. Move undamaged containers away from heat or flame, if possible.

DO NOT USE water, halogenated agents, or ABC dry chemical agents.

These fire extinguishing agents will react with the burning material.

IN CASE OF SPILL: Avoid dusting of powder to the greatest extent possible. Use only non-sparking tools and natural bristle brushes. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Prohibit smoking. Use dry cleanup procedures. Place carefully in dry, water-tight containers. Seal containers. After complete clean-up by sweeping, area may be washed with large amounts of water if necessary.

See Alcoa SDS Number 0123.

MSDS # 84.00

Barium Metal



Section 1: Product and Company Identification

Barium Metal

Synonyms/General Names: Barium**Product Use:** For educational use only**Manufacturer:** Columbus Chemical Industries, Inc., Columbus, WI 53925.

24 Hour Emergency Information Telephone Numbers

CHEMTREC (USA): 800-424-9300**CANUTEC (Canada): 613-424-6666**

Scholar Chemistry; 5100 W. Henrietta Rd, Rochester, NY 14586; (866) 260-0501; www.Scholarchemistry.com

Section 2: Hazards Identification

Soft, silvery, lustrous metal immersed in heavy mineral oil; no odor.

HMIS (0 to 4)

Health	3
Fire Hazard	3
Reactivity	2

WARNING! Flammable solid, dangerous when wet, highly toxic by ingestion.

Flammable solid, keep away from all ignition sources. Contact with water produces flammable gas.

Target organs: Central nervous system, kidneys.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Section 3: Composition / Information on Ingredients

Barium Metal (7440-39-3), 100%

Section 4: First Aid Measures

*Always seek professional medical attention after first aid measures are provided.***Eyes:** Immediately flush eyes with excess water for 15 minutes, lifting lower and upper eyelids occasionally.**Skin:** Immediately flush skin with excess water for 15 minutes while removing contaminated clothing.**Ingestion:** Call Poison Control immediately. Rinse mouth with cold water. Give victim 1-2 tbsp of activated charcoal mixed with 8 oz water.**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration.

Section 5: Fire Fighting Measures

Flammable solid. When heated to decomposition, emits acrid fumes and explosive hydrogen gas.

Protective equipment and precautions for firefighters: Do Not Use carbon dioxide, foam, water or halogenated extinguishing agents. Use class D extinguisher or smother with dry sand, dry clay, dry ground limestone or dry graphite. Firefighters should wear full fire fighting turn-out gear and respiratory protection (SCBA).
Material is not sensitive to mechanical impact or static discharge.

Section 6: Accidental Release Measures

Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all ignition sources and ventilate area. Sweep up spill and place material in a dry container for disposal. See Section 13 for disposal information.

Section 7: Handling and Storage

Red**Handling:** Use with adequate ventilation and do not breathe dust or vapor. Avoid contact with skin, eyes, or clothing. Wash hands thoroughly after handling.**Storage:** Store in Flammable Area [Red Storage] with other flammable materials and away from any strong oxidizers. Store in a dedicated flammables cabinet. Store in a cool, dry, well-ventilated, locked store room away from incompatible materials.

Section 8: Exposure Controls / Personal Protection

Use ventilation to keep airborne concentrations below exposure limits. Have approved eyewash facility, safety shower, and fire extinguishers readily available. Wear chemical splash goggles and chemical resistant clothing such as gloves and aprons. Wash hands thoroughly after handling material and before eating or drinking. Use NIOSH-approved respirator with a dust cartridge. Exposure guidelines: Barium compounds: OSHA PEL: 0.5 mg/m³ and ACGIH TLV: 0.5 mg/m³, STEL: N/A.

Section 9: Physical and Chemical Properties

Molecular formula	Ba.	Appearance	Silver metal in heavy mineral oil.
Molecular weight	137.33.	Odor	No odor.
Specific Gravity	3.62 g/mL @ 20°C..	Odor Threshold	N/A.
Vapor Density (air=1)	N/A.	Solubility	Reacts violently with water.
Melting Point	850°C.	Evaporation rate	N/A (<i>Butyl acetate</i> = 1).
Boiling Point/Range	1695°C.	Partition Coefficient	N/A (<i>log P_{OW}</i>).
Vapor Pressure (20°C)	N/A.	pH	N/A.
Flash Point:	N/A.	UEL	N/A.
Autoignition Temp.:	N/A.	LEL	N/A.

N/A = Not available or applicable

Section 10: Stability and Reactivity

Avoid heat and ignition sources

Stability: Stable under normal conditions of use.

Incompatibility: Water, acids, chlorine, iodine, bromine and oxidizing agents.

Shelf life: Indefinite if stored properly.

Section 11: Toxicology Information

Acute Symptoms/Signs of exposure: *Eyes:* Stinging pain, burns, watering of eyes, inflammation of eyelids and conjunctivitis.

Avoid looking at burning magnesium. *Skin:* Irritation, redness, burns. Powdered metal ignites readily on skin causing burns.

Ingestion: Nausea, vomiting and headache. **Inhalation:** Rapid irregular breathing, headache, burns to mucous membranes.

Inhalation of dust or fumes causes metal fume fever.

Chronic Effects: Repeated/prolonged skin contact may cause dryness or rashes.

Sensitization: none expected

Barium: LD50 [oral, rat]; Not Available; LC50 [rat]; Not Available; LD50 Dermal [rabbit]; Not Available

Material has not been found to be a carcinogen nor produce genetic, reproductive, or developmental effects.

Section 12: Ecological Information

Ecotoxicity (aquatic and terrestrial): LC50 – 500mg/l – 96h – Cyprinodon variegatus.

Section 13: Disposal Considerations

Check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulations. Use a licensed chemical waste disposal firm for proper disposal.

Section 14: Transport Information

DOT Shipping Name:	Barium.	Canada TDG:	Barium .
DOT Hazard Class:	4.3, pg II.	Hazard Class:	4.3, pg II.
Identification Number:	UN1400.	UN Number:	UN1400.

Section 15: Regulatory Information

EINECS: Listed (231-149.1) .

WHMIS Canada: B6:D2B: Reactive Flammable: Toxic Material.

TSCA: All components are listed or are exempt.

California Proposition 65: Not listed.

The product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Section 16: Other Information

Current Issue Date: September 22, 2012

Disclaimer: Scholar Chemistry and Columbus Chemical Industries, Inc., ("S&C") believes that the information herein is factual but is not intended to be all inclusive. The information relates only to the specific material designated and does not relate to its use in combination with other materials or its use as to any particular process. Because safety standards and regulations are subject to change and because S&C has no continuing control over the material, those handling, storing or using the material should satisfy themselves that they have current information regarding the particular way the material is handled, stored or used and that the same is done in accordance with federal, state and local law. S&C makes no warranty, expressed or implied, including (without limitation) warranties with respect to the completeness or continuing accuracy of the information contained herein or with respect to fitness for any particular use.

SAFETY DATA SHEET

Version 4.12
Revision Date 06/18/2015
Print Date 11/13/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Benzyl alcohol

Product Number : 305197
Brand : Sigma-Aldrich
Index-No. : 603-057-00-5

CAS-No. : 100-51-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 + H332
H319
H401

Harmful if swallowed or if inhaled
Causes serious eye irritation.
Toxic to aquatic life.

Precautionary statement(s)

P261
P264
P270
P271
P273
P280

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Wear eye protection/ face protection.

P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: Benzenemethanol
Formula	: C ₇ H ₈ O
Molecular weight	: 108.14 g/mol
CAS-No.	: 100-51-6
EC-No.	: 202-859-9
Index-No.	: 603-057-00-5
Registration number	: 01-2119492630-38-XXXX

Hazardous components

Component	Classification	Concentration
Benzyl alcohol		
	Acute Tox. 4; Eye Irrit. 2A; Aquatic Acute 2; H302 + H332, H319, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas. hygroscopic
Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Benzyl alcohol	100-51-6	TWA	10.000000 ppm	USA. Workplace Environmental Exposure Levels (WEEL)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 43 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -16 - -13 °C (3 - 9 °F) |
| f) Initial boiling point and boiling range | 203 - 205 °C (397 - 401 °F) |
| g) Flash point | 96 °C (205 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 5.00 hPa (3.75 mmHg) at 77 °C (171 °F)
17.7 hPa (13.3 mmHg) at 100 °C (212 °F)
0.125 hPa (0.094 mmHg) at 25 °C (77 °F) |
| l) Vapour density | 3.73 - (Air = 1.0) |
| m) Relative density | 1.045 g/mL at 25 °C (77 °F) |
| n) Water solubility | 33 g/l at 20 °C (68 °F) |
| o) Partition coefficient: n-octanol/water | log Pow: 1.1 log Pow: 1.05 at 20 °C (68 °F) |

octanol/water

- | | | |
|----|---------------------------|-------------------|
| p) | Auto-ignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

9.2 Other safety information

Surface tension	39 mN/m at 20 °C (68 °F)
Relative vapour density	3.73 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

hygroscopic

Stable under recommended storage conditions.

Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

A mixture of benzyl alcohol and 58% sulfuric acid decomposed violently when heated to 180°C. Benzyl alcohol containing 1.4% hydrogen bromide and 1.1% of an iron(II) salt polymerized exothermally when heated above 100°C.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 1,230 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Excitement. Behavioral:Coma.

LD50 Oral - Rat - male - 1,620 mg/kg

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 24 h

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation - 24 h

(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DN3150000

Central nervous system depression

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

- Toxicity to fish LC50 - Lepomis macrochirus (Bluegill) - 10 mg/l - 96 h
 LC50 - Pimephales promelas (fathead minnow) - 460 mg/l - 96 h
- Toxicity to daphnia and EC50 - Daphnia magna (Water flea) - 55 mg/l - 24 h
other aquatic
invertebrates
 - Daphnia magna (Water flea) - 230 mg/l - 48 h
 (OECD Test Guideline 202)

12.2 Persistence and degradability

- Biodegradability Biotic/Aerobic - Exposure time 28 d
 Result: 92 - 96 % - Readily biodegradable
 aerobic Biochemical oxygen demand - Exposure time 7 d
 Result: 92 - 96 % - Readily biodegradable
 (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3334 Class: 9

Proper shipping name: A Aviation regulated liquid, n.o.s. (Benzyl alcohol)

Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

UN number: 3334 Class: 9

Packing group: III

Proper shipping name: Aviation regulated liquid, n.o.s. (Benzyl alcohol)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzyl alcohol	100-51-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzyl alcohol	100-51-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzyl alcohol	100-51-6	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute	Acute aquatic toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.12

Revision Date: 06/18/2015

Print Date: 11/13/2016

SAFETY DATA SHEET

Version 5.4
Revision Date 01/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzyl butyl phthalate

Product Number : 308501
Brand : Aldrich
Index-No. : 607-430-00-3

CAS-No. : 85-68-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Reproductive toxicity (Category 1B), H360
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H360

May damage fertility or the unborn child.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P273

Avoid release to the environment.

P281

Use personal protective equipment as required.

P308 + P313

IF exposed or concerned: Get medical advice/ attention.

P391

Collect spillage.

P405

Store locked up.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none**3. COMPOSITION/INFORMATION ON INGREDIENTS****3.1 Substances**

Formula : C₁₉H₂₀O₄
Molecular weight : 312.36 g/mol
CAS-No. : 85-68-7
EC-No. : 201-622-7
Index-No. : 607-430-00-3

Hazardous components

Component	Classification	Concentration
Benzyl butyl phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H360, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES**4.1 Description of first aid measures****General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nature latex/chloroprene

Minimum layer thickness: 0.6 mm

Break through time: 60 min

Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/freezing point: < -34.99 °C (< -30.98 °F) |
| f) Initial boiling point and boiling range | 370 °C (698 °F) |
| g) Flash point | 113.0 °C (235.4 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 19.2 hPa (14.4 mmHg) at 250.0 °C (482.0 °F)
0.3 hPa (0.2 mmHg) at 150.0 °C (302.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.1 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | 0.00269 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - slightly soluble |
| o) Partition coefficient: n-octanol/water | log Pow: 4.91 at 20 °C (68 °F) |
| p) Auto-ignition temperature | 232.0 °C (449.6 °F) |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |

t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - 2,330 mg/kg
(OECD Test Guideline 401)

Inhalation: No data available

LD50 Dermal - Rabbit - > 10,000 mg/kg

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

- Guinea pig

Result: Does not cause skin sensitisation.

Germ cell mutagenicity

Ames test

S. typhimurium

Result: negative

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Benzyl butyl phthalate)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Presumed human reproductive toxicant

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

Repeated dose toxicity - Rat - male - Oral - No observed adverse effect level - 550 mg/kg

RTECS: TH9990000

May cause endocrine disruption.

pancreas -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - <i>Lepomis macrochirus</i> (Bluegill) - 1.7 mg/l - 96.0 h
	NOEC - <i>Oncorhynchus mykiss</i> (rainbow trout) - 0.48 mg/l - 96.0 h
	flow-through test LC50 - <i>Pimephales promelas</i> (fathead minnow) - 2.1 mg/l - 96 h
	(OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - <i>Daphnia magna</i> (Water flea) - 1.8 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - <i>Desmodesmus subspicatus</i> (green algae) - 0.31 mg/l - 72 h
	(OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 14 d
	Result: 81 % - Readily biodegradable

12.3 Bioaccumulative potential

Bioaccumulation	<i>Lepomis macrochirus</i> (Bluegill) - 21 d
	- 0.00973 mg/l
	Bioconcentration factor (BCF): 663

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Benzyl butyl phthalate)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: yes
Poison Inhalation Hazard: No

IMDG

UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Benzyl butyl phthalate)
Marine pollutant: yes

IATA

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Benzyl butyl phthalate)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Benzyl butyl phthalate	85-68-7	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H360	May damage fertility or the unborn child.

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4

Revision Date: 01/02/2015

Print Date: 02/18/2016

SAFETY DATA SHEET

Version 3.7
Revision Date 05/24/2016
Print Date 11/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Bis(2-chloroethyl) ether

Product Number : 35660
Brand : Sigma-Aldrich
Index-No. : 603-029-00-2

CAS-No. : 111-44-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 1), H330
Acute toxicity, Dermal (Category 2), H310
Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H226

Flammable liquid and vapour.

H301

Toxic if swallowed.

H310 + H330

Fatal in contact with skin or if inhaled

H351

Suspected of causing cancer.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310	Immediately call a POISON CENTER/doctor.
P320	Specific treatment is urgent (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 2,2'-Dichlorodiethyl ether
Formula	: C ₄ H ₈ Cl ₂ O
Molecular weight	: 143.01 g/mol
CAS-No.	: 111-44-4
EC-No.	: 203-870-1
Index-No.	: 603-029-00-2

Hazardous components

Component	Classification	Concentration
bis(2-Chloroethyl) ether		
	Flam. Liq. 3; Acute Tox. 3; Acute Tox. 1; Acute Tox. 2; Carc. 2; H226, H301, H310 + H330, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
bis(2-Chloroethyl) ether	111-44-4	TWA	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Nausea Not classifiable as a human carcinogen Danger of cutaneous absorption		
		STEL	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Nausea Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	5.000000 ppm 30.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		
		ST	10.000000 ppm 60.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		
		C	15.000000 ppm 90.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.		
		PEL	5 ppm 30 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		
		STEL	10 ppm 60 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm

Break through time: 480 min

Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -47 °C (-53 °F) - lit. |
| f) Initial boiling point and boiling range | 65 - 67 °C (149 - 153 °F) at 20 hPa (15 mmHg) - lit. |
| g) Flash point | 55.0 °C (131.0 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |

m) Relative density	1.22 g/mL at 25 °C (77 °F)
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 75.0 mg/kg

LC50 Inhalation - Rat - 4 h - 330 mg/m³

LD50 Dermal - Rabbit - 90.0 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Open irritation test

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Severe irritation

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: KN0875000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

12. ECOLOGICAL INFORMATION

12.1 Toxicity

- Toxicity to fish LC50 - *Lepomis macrochirus* (Bluegill) - 600.00 mg/l - 96 h
- Toxicity to daphnia and other aquatic invertebrates EC50 - *Daphnia magna* (Water flea) - 240.00 mg/l - 48 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

- Bioaccumulation *Lepomis macrochirus* (Bluegill) - 14 d
- 0.00991 mg/l

Bioconcentration factor (BCF): 11

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1916 Class: 6.1 (3) Packing group: II
Proper shipping name: 2,2'-Dichlorodiethyl ether
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1916 Class: 6.1 (3) Packing group: II EMS-No: F-E, S-D
Proper shipping name: 2,2'-DICHLORODIETHYL ETHER

IATA

UN number: 1916 Class: 6.1 (3) Packing group: II
Proper shipping name: 2,2'-Dichlorodiethyl ether

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
bis(2-Chloroethyl) ether	111-44-4	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
bis(2-Chloroethyl) ether	111-44-4	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
bis(2-Chloroethyl) ether	111-44-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
bis(2-Chloroethyl) ether	111-44-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
bis(2-Chloroethyl) ether	111-44-4	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
bis(2-Chloroethyl) ether	111-44-4	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H301	Toxic if swallowed.
H310	Fatal in contact with skin.
H310 + H330	Fatal in contact with skin or if inhaled
H330	Fatal if inhaled.
H351	Suspected of causing cancer.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.7

Revision Date: 05/24/2016

Print Date: 11/03/2016

APG**Analytical Products Group, Inc.**2730 Washington Blvd., Belpre, OH 45714
740-423-4200 800-272-4442 Fax 740-423-5588**Material Safety Data Sheet**

Date prepared on: 9/18/95

Last revised on: 1/20/08

Page 1

Section I: Product Identification

CATALOG NUMBER: 2600,4230,4232,4233	PRODUCT NAME: BTEX
-------------------------------------	--------------------

Section II - Hazardous Ingredients/Identity Information

Chemical Name	CAS Reg. No.	OSHA PEL (TWA)	% Composition*
Methanol	67-56-1	200ppm	>90%
A table of the compounds possible in this purgeable aromatic analytical standard is attached. Data included in the table are formulas, CAS numbers, oral LD50 values for rats and PEL/TWA values if available. Total concentration of purgeable aromatic compounds in the standard is less than 2% with individual compound concentrations of less than 0.1%.			

Non-Hazardous Ingredients/Identity Information

Chemical Name	CAS Reg. No.	OSHA PEL (TWA)	% Composition*

* Components are calculated on a weight/weight basis.

Section III - Physical/Chemical Characteristics of Hazardous Ingredients

BOILING POINT: 65 C (149 F)		SPECIFIC GRAVITY: (water=1) 0.79	
VAPOR PRESSURE: 97 mmHg @ 20 C	SOLUBILITY IN WATER: Complete	APPEARANCE/ODOR: Clear, colorless liquid with pungent odor (methanol).	

Section IV - Fire and Explosion Hazard Data

FLASH POINT (Method used): 12 C (54 F) Closed cup	AUTO IGNITION TEMPERATURE: 463 C (867 F)	FLAMMABLE LIMITS	LEL 6%	UEL 36%
EXTINGUISHING MEDIA: Use extinguisher media appropriate for surrounding fire since sample size is small. Alcohol foam, dry chemical or carbon dioxide (water may be ineffective in most laboratory situations.)				
SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if it can be done without risk. Use water to keep fire exposed containers cool.				
UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors may flow along surfaces to distant ignition sources and flash back. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire. Burns with a clear, almost invisible flame.				

Section V - Reactivity Data

STABILITY:	Unstable <input type="checkbox"/>	Stable <input checked="" type="checkbox"/>	Conditions to Avoid: Heat, flame and other sources of ignition.
INCOMPATIBILITY (Materials to avoid): Strong oxidizing agents, strong acids, zinc, aluminum and magnesium.			
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide and formaldehyde.			
HAZARDOUS POLYMERIZATION:	May Occur <input type="checkbox"/>	Will Not Occur <input checked="" type="checkbox"/>	Conditions to Avoid: N/A

Section VI - Health Hazard Data

ROUTES OF ENTRY	Inhalation? YES	Skin? YES	Ingestion? YES
HEALTH HAZARDS (Acute and Chronic): ACUTE: Yes, see chronic symptoms. CHRONIC: Yes, methanol ingestion may be fatal or cause blindness, headache, nausea, vomiting, dizziness, gastrointestinal irritation, central nervous system depression or hearing loss.			
COMPONENTS LISTED AS CARCINOGENS OR POTENTIAL CARCINOGENS: No, not listed in IARC monograph.			
SIGNS AND SYMPTOMS OF EXPOSURE: Irritation of skin, eyes, nose, throat and headache. Prolonged contact may cause dermatitis. Exposure effects may differ between individuals			
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Eye disorders, skin disorders, liver and kidney disorders			
EMERGENCY AND FIRST AID PROCEDURES: Seek medical assistance for treatment, observation and support if necessary. EYE CONTACT: Flush with water, obtain medical attention. SKIN CONTACT: Wash with soap and water, use protective creams. INHALATION: Remove to fresh air, if not breathing give artificial respiration. If breathing is difficult, give oxygen and obtain medical attention. INGESTION: If conscious, give water and baking soda and induce vomiting. Obtain medical assistance immediately.			

Section VII - Precautions for Safe Handling and Use

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: (Sample) shut off ignition sources. No flares, smoking or flames in area. Take up with sand or other non-combustible absorbent material and place into container for later disposal. Flush area with water.
WASTE DISPOSAL METHOD: Dispose in accordance with all applicable federal, state and local environmental regulations. Excess sample should be placed in a proper waste solvent container.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep container tightly closed, store in a cool, dry, well ventilated, flammable liquid storage area.
OTHER PRECAUTIONS* Do not heat or evaporate sample to dryness.

Section VIII - Control Measures

RESPIRATORY PROTECTION (Please specify): Required if airborne concentration exceeds TWA of 200 ppm.	
VENTILATION: Local exhaust. (general or local exhausts meet TLV regulations).	
PROTECTIVE GLOVES: Rubber gloves recommended.	EYE PROTECTION: Safety glasses or goggles.
OTHER PROTECTIVE EQUIPMENT: N/A	
EMERGENCY WASH FACILITIES: Maintain eye wash and quick drench showers in work area	

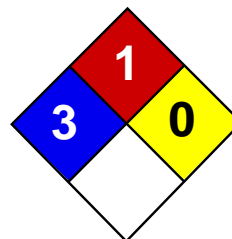
The information stated in this Material Safety Data Sheet (MSDS) is believed to be correct on the date of publication and must not be considered all conclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. Persons not specifically and properly trained should not handle this chemical or its container. This MSDS is provided without any warranty expressed or implied, including merchantability or fitness for any particular purpose.

This product is furnished for laboratory use ONLY! Our standards may not be used as drugs, cosmetics, agricultural or pesticidal products, food additives or as house hold chemicals.

* Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Environmental Protection Agency, and others) may have specific regulations concerning the transportation, handling, storage or use of this product which may not be contained herein. The customer or user of this product should be familiar with these regulations.

Hazardous components of the Volatiles Standard

<i>CHEMICAL</i>	<i>CAS #</i>	<i>% by WEIGHT</i>	<i>LD50</i>
Ethylbenzene	100-41-4	<0.2%	3500 mg/kg
Benzene	71-43-2	<0.2%	4894 mg/kg
Toluene	108-88-3	<0.2%	7000 mg/kg
m-Xylene	108-38-3	<0.2%	5 gm/kg
p-Xylene	106-42-3	<0.2%	5 gm/kg
o-Xylene	95-47-6	<0.2%	1364 mg/kg



Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 890 mg/kg [Mouse]. Acute toxicity of the dust (LC50): 229.9 mg/m³ 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium Pennsylvania RTK: Cadmium Massachusetts RTK: Cadmium TSCA 8(b) inventory: Cadmium SARA 313 toxic chemical notification and release reporting: Cadmium CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R26- Very toxic by inhalation. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérigènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:29 PM

Last Updated: 11/01/2010 12:00 PM

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Material Safety Data Sheet

Calcium

MSDS# 03840

Section 1 - Chemical Product and Company Identification

MSDS Name: Calcium

Catalog Numbers: AC201180000, AC201180050, AC201181000, AC201185000, AC201380000, AC201381000, AC201381000, AC201385000, AC318100000, AC318100050, AC365740000, AC365741000, AC365741000, AC365745000

Synonyms: Calcium metal, turnings, crystals, granular; Calciat.

Company Identification: Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410

For information in the US, call: 201-796-7100

Emergency Number US: 201-796-7100

CHEMTREC Phone Number, US: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#: 7440-70-2

Chemical Name: Calcium

%: 99+

EINECS#: 231-179-5

Hazard Symbols: F



Risk Phrases: 15

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Danger! Flammable solid. Causes burns by all exposure routes. Contact with water liberates extremely flammable gases.

Target Organs: Respiratory system, gastrointestinal system, eyes, skin.

Potential Health Effects

Eye: Causes eye burns.

Skin: Causes skin burns. May be harmful if absorbed through the skin.

Ingestion: Causes gastrointestinal tract burns. May be harmful if swallowed.

Inhalation: Causes chemical burns to the respiratory tract. May be harmful if inhaled.

Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Do not induce vomiting. Get medical aid immediately. Call a poison control center.

Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance;

Inhalation: induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Notes to
Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Will burn if involved in a fire. Water reactive. Material will react with water and may release a flammable and/or toxic gas. Flammable solid.

Extinguishing Media: Use foam, dry chemical, or carbon dioxide. DO NOT USE WATER!

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Explosion Limits: Not available
Lower:

Explosion Limits: Not available
Upper:

NFPA Rating: ; Special Hazard: -W-

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Vacuum or sweep up material and place into a suitable disposal container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section).

Spills/Leaks: Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Do not expose spill to water. Place under an inert atmosphere. Do not get water inside containers. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Do not allow water to get into the container because of violent reaction. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Keep away from heat, sparks and flame. Do not ingest or inhale. Handle under an inert atmosphere. Do not allow contact with water. Use only in a chemical fume hood.

Storage: Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Water free area. Store protected from moisture. Store under an inert atmosphere.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Calcium	none listed	none listed	none listed

OSHA Vacated PELs: Calcium: None listed

Engineering Controls:

Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Color: grey

Odor: none reported

pH: 14 (4g/L aq.sol.)

Vapor Pressure: 13 mbar @ 983 deg C

Vapor Density: Not available

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: 1484 deg C @ 760 mmHg (2,703.20°F)

Freezing/Melting Point: 845 deg C (1,553.00°F)

Decomposition Temperature: Not available

Solubility in water: Reacts

Specific Gravity/Density: Not available.

Molecular Formula: Ca

Molecular Weight: 40.07

Section 10 - Stability and Reactivity

Chemical Stability: Reacts with water. Water contact produces hydrogen gas.

Conditions to Avoid: Incompatible materials, ignition sources, dust generation, excess heat, exposure to moist air or water.

Incompatibilities with Other Materials: Strong oxidizing agents, acids, alcohols, ammonia, halogens, sulfur, oxygen, phosphorus oxide, mercury, alkali hydroxides, metal oxides, alkali halides, nitrogen oxide.

Hazardous Decomposition Products: Hydrogen gas.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 7440-70-2: EV8500000

LD50/LC50: RTECS: Not available.

Carcinogenicity: Calcium - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Other: Do not empty into drains.

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: CALCIUM

Hazard Class: 4.3

UN Number: UN1401

Packing Group: II

Canada TDG

Shipping Name: CALCIUM

Hazard Class: 4.3

UN Number: UN1401

Packing Group: II

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: F

Risk Phrases:

R 15 Contact with water liberates extremely flammable gases.

Safety Phrases:

S 8 Keep container dry.

S 24/25 Avoid contact with skin and eyes.

S 43C In case of fire, use limestone powder, sodium chloride or dry sand (never use water).

WGK (Water Danger/Protection)

CAS# 7440-70-2: 1

Canada

CAS# 7440-70-2 is listed on Canada's DSL List

Canadian WHMIS Classifications: E, B6

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 7440-70-2 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 7440-70-2 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 5/19/1999

Revision #7 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

SAFETY DATA SHEET

Version 3.8
Revision Date 10/12/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbazole

Product Number : C5132
Brand : Sigma

CAS-No. : 86-74-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 2), H351

Chronic aquatic toxicity (Category 4), H413

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H351

Suspected of causing cancer.

H413

May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P273

Avoid release to the environment.

P281

Use personal protective equipment as required.

P308 + P313

IF exposed or concerned: Get medical advice/ attention.

P405

Store locked up.

P501

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C₁₂H₉N
Molecular weight : 167.21 g/mol
CAS-No. : 86-74-8
EC-No. : 201-696-0

Hazardous components

Component	Classification	Concentration
Carbazole		
	Carc. 2; Aquatic Chronic 4; H351, H413	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Nitrogen oxides (NO_x)

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|--|
| a) Appearance | Form: powder
Colour: beige |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 243 - 246 °C (469 - 475 °F) |
| f) Initial boiling point and boiling range | 355 °C (671 °F) |
| g) Flash point | 220.0 °C (428.0 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | The product is not flammable. |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 533 hPa (400 mmHg) at 323 °C (613 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.1 g/cm ³ at 18 °C (64 °F) |
| n) Water solubility | 0.00091 g/l at 25 °C (77 °F) |
| o) Partition coefficient: n-octanol/water | log Pow: 3.72 at 22 °C (72 °F) |
| p) Auto-ignition temperature | > 600 °C (> 1,112 °F) at 1,013 hPa (760 mmHg) |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD0 Oral - Rat - > 16,000 mg/kg

(OECD Test Guideline 401)

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Carcinogenicity - Mouse - male and female - Oral
hepatocellular carcinoma

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Carbazole)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: FE3150000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.93 mg/l - 96.0 h Remarks: No toxicity at the limit of solubility
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 2.30 - 4.90 mg/l - 48 h Remarks: No toxicity at the limit of solubility
Toxicity to algae	Growth inhibition NOEC - Scenedesmus acuminatus - > 0.4 mg/l - 96 h Remarks: No toxicity at the limit of solubility

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 42 d - 0.05 mg/l Bioconcentration factor (BCF): 241 Cyprinus carpio (Carp) - 42 d - 0.005 mg/l Bioconcentration factor (BCF): 200
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12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Carbazole)
Marine pollutant: yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Carbazole)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Carbazole	86-74-8	2009-07-17

New Jersey Right To Know Components

	CAS-No.	Revision Date
Carbazole	86-74-8	2009-07-17

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
Carbazole	86-74-8	2007-09-28

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H351	Suspected of causing cancer.
H413	May cause long lasting harmful effects to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0
Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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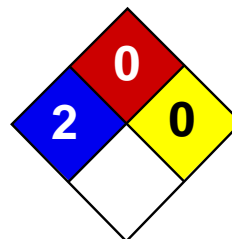
Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.8

Revision Date: 10/12/2015

Print Date: 01/29/2016



Health	2
Fire	0
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Chloroform MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chloroform

Catalog Codes: SLC1888, SLC5044

CAS#: 67-66-3

RTECS: FS9100000

TSCA: TSCA 8(b) inventory: Chloroform

CI#: Not available.

Synonym: Trichloromethane; Methane, trichlor-

Chemical Name: Chloroform

Chemical Formula: CHCl₃

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chloroform	67-66-3	100

Toxicological Data on Ingredients: Chloroform: ORAL (LD50): Acute: 695 mg/kg [Rat]. 36 mg/kg [Mouse]. 820 mg/kg [Guinea pig]. DERMAL (LD50): Acute: >20000 mg/kg [Rabbit]. VAPOR (LC50): Acute: 47702 mg/m 4 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, heart. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: May explode if it comes in contact with aluminum powder, lithium, perchlorate, pentoxide, bis(dimethylamino)dimethylstannane, potassium, potassium-sodium alloy, sodium (or sodium hydroxide or sodium methoxide), and methanol

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions: Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the workstation location.

Personal Protection: Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill: Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: TWA: 10 (ppm) [Australia] Inhalation TWA: 2 (ppm) from OSHA (PEL) [United States] Inhalation STEL: 9.78 (mg/m³) from NIOSH Inhalation STEL: 2 (ppm) from NIOSH Inhalation TWA: 9.78 (mg/m³) from OSHA (PEL) [United States] Inhalation TWA: 10 (ppm) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 2 (ppm) [United Kingdom (UK)] Inhalation TWA: 9.9 (mg/m³) [United Kingdom (UK)] Inhalation Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pleasant. Sweetish. Etheric. Non-irritating

Taste: Burning. Sweet.

Molecular Weight: 119.38 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 61°C (141.8°F)

Melting Point: -63.5°C (-82.3°F)

Critical Temperature: 263.33°C (506°F)

Specific Gravity: 1.484 (Water = 1)

Vapor Pressure: 21.1 kPa (@ 20°C)

Vapor Density: 4.36 (Air = 1)

Volatility: Not available.

Odor Threshold: 85 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, Light

Incompatibility with various substances: Reactive with metals, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Light Sensitive. Incompatible with triisopropyl phosphine, acetone, disilane, fluorine, strong bases and reactive metals (aluminum, magnesium in powdered form), light.

Special Remarks on Corrosivity: It will attack some forms of plastics, rubber, and coatings.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation.

Toxicity to Animals: WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 36 mg/kg [Mouse]. Acute dermal toxicity (LD50): >20000 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 47702 mg/m 4 hours [Rat]. 3

Chronic Effects on Humans: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, heart.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material (possible mutagen) and cause adverse reproductive effects(embryotoxicity and fetotoxicity) Suspected carcinogen (tumorigenic) and teratogen based on animal data. Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans: Acute Potential Health Effects: Skin: Causes skin irritation and may cause chemical burns. Eye: Causes eye irritation, burning pain and reversible injury to corneal epithelium. Inhalation: Causes irritation of the respiratory system (mucous membranes). May affect behavior/Nervous system (CNS depressant, fatigue, dizziness, nervousness, giddiness, euphoria, loss of coordination and judgement, weakness, hallucinations, muscle contraction/spasticity, general anesthetic, spastic paralysis, headache), anorexia (neurological and gastrointestinal symptoms resembling chronic alcoholism), and possibly coma and death. May affect the liver, kidneys and gastrointestinal tract (nausea, vomiting). Ingestion: Causes gastrointestinal tract irritation (nausea, vomiting). May affect the liver, urinary system (kidneys), respiration, behavior/nervous system (symptoms similar to inhalation),and heart. Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect the liver (hepatitis, jaundice, hepatocellular necrosis), metabolism (weight loss), respiration (fibrosis, pneumoconiosis), behavior/central nervous system (symptoms similar to acute inhalation), blood, musculoskeletal system, and kidneys. Ingestion: Prolonged or repeated ingestion may affect the liver, kidneys, metabolism (weight loss), endocrine system (spleen), blood (changes in cell count).

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 43.8 mg/l 96 hours [Trout].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Chloroform UNNA: UN1888 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations: California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Chloroform California prop. 65 (no significant risk level): Chloroform: 0.02 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Chloroform New York release reporting list: Chloroform Rhode Island RTK hazardous substances: Chloroform Pennsylvania RTK: Chloroform Massachusetts RTK: Chloroform New Jersey: Chloroform California Director's List of Hazardous Substances (8 CCR 339): Chloroform Tennessee: Chloroform TSCA 8(b) inventory: Chloroform TSCA 8(d) H and S data reporting: Chloroform: effective: 6/1/87; sunset: 6/1/97 SARA 302/304/311/312 extremely hazardous substances: Chloroform SARA 313 toxic chemical notification and release reporting: Chloroform CERCLA: Hazardous substances.: Chloroform: 10 lbs. (4.536 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R20/22- Harmful by inhalation and if swallowed. R38- Irritating to skin. R40- Possible risks of irreversible effects. S36/37- Wear suitable protective clothing and gloves.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet

Product Name: COBALT-BASED ALLOYS

ID: 1147

*** Section 1 - Chemical Product and Company Identification ***

Chemical Formula: Cobalt (Co), chromium (Cr) and other alloying elements

Product Use: Cast aerospace parts

Other Designations: 694, 98M2, CoCrNiMoFe, ECY 768, F75, FSX 414, G34, How 1, How 3, How 6, How 12, How 19, How 21, How 25 (L605), How 31 (X40), How 36, How F, How J, Mar-M 302, Mar-M 509, Mar-M 918, Merle 72, MP35N, S 816, PT1377, PT1508, WI 52, X 45 and other Cobalt-Based Alloys

Alcoa Inc.
201 Isabella Street
Pittsburgh, PA 15212-5858

Phone: Health and Safety: 1-412-553-4649

Emergency Information: USA: Chemtrec: 1-800-424-9300 or 1-703-527-3887

Alcoa: 1-412-553-4001

Website: For a current MSDS, refer to Alcoa websites: www.alcoa.com or Internally at my.alcoa.com EHS Community

*** Section 2 - Hazards Identification ***

EMERGENCY OVERVIEW

Solid. Metallic appearance. Odorless. Non-combustible as supplied.

Explosion/fire hazards may be present when (See Sections 5, 7 and 10 for additional information):

* Molten metal is in contact with water/moisture.

* Heavily concentrated dust clouds are dispersed in the air.

Dust and fume from processing can cause irritation of eyes, skin and upper respiratory tract.

POTENTIAL HEALTH EFFECTS

The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

The health effects listed below are not likely to occur unless processing or recycling/combustion generate dusts or fumes.

Eyes Dust or fume from processing: Can cause irritation.

Skin Dust or fume from processing: Can cause irritation, sensitization and allergic contact dermatitis.

Inhalation Health effects from mechanical processing (e.g., cutting, grinding): Can cause upper respiratory tract irritation. **Chronic overexposures:** Can cause asthma, respiratory sensitization, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Additional health effects from elevated temperature processing (e.g., welding, melting): **Acute overexposures:** Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever). **Chronic overexposures:** Can cause the accumulation of fluid in the lungs (pulmonary edema) and lung cancer.

Carcinogenicity and Reproductive Hazard

Product as shipped: Does not present any cancer or reproductive hazards.

Dust and fumes from mechanical processing: Can present a cancer hazard (nickel, cobalt). Can present a reproductive hazard for males (manganese).

Dust and fumes from welding or elevated temperature processing: Can present a cancer hazard (hexavalent chromium compounds, nickel compounds, welding fumes, cobalt compounds). Can present a reproductive hazard for males (manganese).

Medical Conditions Aggravated By Exposure to Product, Components or Compounds Formed During Processing

Dust or fume from processing: Asthma, chronic lung disease, skin rashes and secondary Parkinson's disease.

Material Safety Data Sheet

Product Name: COBALT-BASED ALLOYS

ID: 1147

*** Section 3 - Composition / Information on Ingredients ***

Complete composition is provided below and may include some components classified as non-hazardous.

CAS #	Component	Percent
7440-48-4	Cobalt	35-65
7440-47-3	Chromium	15-35
7440-02-0	Nickel	0-35
7440-33-7	Tungsten	0-25
7439-89-6	Iron	0-20
7439-98-7	Molybdenum	0-15
7440-25-7	Tantalum	0-10
7440-62-2	Vanadium	0-5
7439-96-5	Manganese	0-5
7429-90-5	Aluminum	0-5
7440-03-1	Niobium	0-5
7440-21-3	Silicon	0-5
7440-44-0	Carbon	0-5

Component Information

Additional compounds which may be formed during processing are listed in Section 8.

*** Section 4 - First Aid Measures ***

First Aid: Eyes

Dust or fume from processing: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

First Aid: Skin

Dust or fume from processing: Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists.

First Aid: Inhalation

Dust or fume from processing: Remove to fresh air. If unconscious or severely injured, check for clear airway, breathing and presence of pulse. Perform CPR if there is no pulse or respiration. Consult a physician.

*** Section 5 - Fire Fighting Measures ***

Flammable/Combustible Properties

This product does not present fire or explosion hazards as shipped. Dust and fines may be ignitable.

Fire/Explosion

May be a potential hazard under the following conditions:

* Molten metal in contact with water/moisture. Moisture entrapped by molten metal can be explosive. * Dust or fines dispersed in the air can be explosive. Heavily concentrated dusts in air can be explosive if subjected to a strong ignition source.

Extinguishing Media

Use a Class D agent, fluxing salts, graphite or dry sand on dust or fine fires. Otherwise, use fire fighting methods and materials that are appropriate for surrounding fire.

Unsuitable Extinguishing Media

DO NOT USE:

* Water around molten metal.

These agents will react with the burning material.

Fire Fighting Equipment/Instructions

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

Material Safety Data Sheet

Product Name: COBALT-BASED ALLOYS

ID: 1147

*** Section 6 - Accidental Release Measures ***

Small/Large Spill: Avoid generating dust. Recover using mechanical means. Collect scrap for recycling.

*** Section 7 - Handling and Storage ***

Handling/Storage

Avoid generating dust. Avoid contact with sharp edges or heated metal. Product should be kept dry. Do not eat, drink, apply cosmetics, or smoke when handling or using.

Requirements for Remelting of Scrap Material and/or Ingot

Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.

During melting operations, the following minimum guidelines should be observed:

- * Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- * Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- * Preheat and dry large or heavy items such as ingot adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400°F and then hold at that temperature for 6 hours.

*** Section 8 - Exposure Controls / Personal Protection ***

Engineering Controls

If dust or fumes are generated through processing: Use with adequate ventilation to meet the limits listed in Section 8, Exposure Guidelines.

Personal Protective Equipment

Respiratory Protection

If dust or fumes are generated through processing: Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8, Exposure Guidelines. Suggested respiratory protection: N95

Eye Protection Wear safety glasses/goggles to avoid eye injury.

Skin Protection Wear appropriate gloves to avoid any skin injury.

General

Personnel who handle and work with **molten metal** should utilize primary protective clothing like polycarbonate face shields, fire resistant tapper's jackets, neck shades (snoods), leggings, spats and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal. Synthetic materials should never be worn even as secondary clothing (undergarments).

Exposure Guidelines

A: General Product Information

No Occupational Exposure Limit has been developed specifically for this product.

Alcoa recommends an Occupational Exposure Limit for **Cobalt** of 0.02 mg/m3 TWA.

Alcoa recommends an Occupational Exposure Limit for **Chromium (VI) Compounds [both soluble and insoluble forms]** of 0.25 ug/m3 TWA as chromium.

Alcoa recommends an Occupational Exposure Limit for **Nickel Compounds** of 0.1 mg/m3 TWA.

Alcoa recommends Occupational Exposure Limits for **Manganese** of 0.05 mg/m3 TWA (total particulate) and 0.02 mg/m3 TWA (respirable fraction).

Material Safety Data Sheet

Product Name: COBALT-BASED ALLOYS

ID: 1147

B: Component Exposure Limits

Cobalt (7440-48-4)

ACGIH 0.02 mg/m3 TWA

OSHA 0.1 mg/m3 TWA (dust and fume)

Chromium (7440-47-3)

ACGIH 0.5 mg/m3 TWA

OSHA 1 mg/m3 TWA

Nickel (7440-02-0)

ACGIH 1.5 mg/m3 TWA (inhalable fraction)

OSHA 1 mg/m3 TWA

Tungsten (7440-33-7)

ACGIH 5 mg/m3 TWA

ACGIH 10 mg/m3 STEL

Molybdenum (7439-98-7)

ACGIH 10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)

OSHA 15 mg/m3 TWA (total dust)

Tantalum (7440-25-7)

ACGIH 5 mg/m3 TWA (dust)

OSHA 5 mg/m3 TWA

Vanadium (7440-62-2)

OSHA 0.5 mg/m3 Ceiling (respirable dust, as V₂O₅); 0.1 mg/m3 Ceiling (fume, as V₂O₅)

Manganese (7439-96-5)

ACGIH 0.2 mg/m3 TWA

OSHA 5 mg/m3 Ceiling (fume)

Aluminum (7429-90-5)

ACGIH 10 mg/m3 TWA (metal dust)

OSHA 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

Silicon (7440-21-3)

OSHA 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

C: Exposure Limits for Additional Compounds Which May Be Formed During Processing

Chromium (II) compounds (Not Available)

OSHA 0.5 mg/m3 TWA (as Cr)

Chromium (III) Compounds (Not Available)

ACGIH 0.5 mg/m3 TWA (as Cr)

OSHA 0.5 mg/m3 TWA (as Cr)

Chromium (VI) compounds- water soluble (Not Available)

ACGIH 0.05 mg/m3 TWA (as Cr)

Chromium (VI) compounds (certain water insoluble forms) (Not Available)

ACGIH 0.01 mg/m3 TWA (as Cr)

Chromium (VI) (18540-29-9)

OSHA 2.5 µg/m3 Action Level; 5 µg/m3 TWA (Cancer hazard - See 29 CFR 1910.1026)

Nickel insoluble compounds (Not Available)

ACGIH 0.2 mg/m3 TWA (inhalable fraction, as Ni)

OSHA 1 mg/m3 TWA (as Ni)

Tungsten, insoluble compounds (Not Available)

ACGIH 5 mg/m3 TWA (as W)

ACGIH 10 mg/m3 STEL (as W)

Iron oxide (1309-37-1)

ACGIH 5 mg/m3 TWA (respirable fraction)

OSHA 10 mg/m3 TWA

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Molybdenum insoluble compounds (Not Available)

ACGIH 10 mg/m³ TWA (inhalable fraction, as Mo); 3 mg/m³ TWA (respirable fraction, as Mo)

OSHA 15 mg/m³ TWA (total dust)

Tantalum oxide (1314-61-0)

ACGIH 5 mg/m³ TWA (dust, as Ta)

OSHA 5 mg/m³ TWA (dust)

Vanadium pentoxide (1314-62-1)

ACGIH 0.05 mg/m³ TWA (dust or fume, respirable fraction)

OSHA 0.5 mg/m³ Ceiling (respirable dust, as V₂O₅); 0.1 mg/m³ Ceiling (fume, as V₂O₅)

Manganese compounds, inorganic (Not Available)

ACGIH 0.2 mg/m³ TWA (as Mn)

OSHA 5 mg/m³ Ceiling (as Mn) (related to Manganese compounds)

Aluminum oxide (1344-28-1)

ACGIH 10 mg/m³ TWA (particulate matter containing no asbestos and <1% crystalline silica)

OSHA 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)

*** Section 9 - Physical & Chemical Properties ***

Physical State: Solid

Boiling Point: Not determined

Vapor Pressure: Not applicable

Solubility in Water: Not soluble

Density: 550 lb/ft³ (8.8 g/cm³)

Odor: Odorless

Octanol-Water Coefficient: Not applicable

Appearance: Metallic appearance

Melting Point: 2719°F (1493°C) Cobalt

Vapor Density: Not applicable

Specific Gravity: See Density

pH Level: Not applicable

Odor Threshold: Not applicable

*** Section 10 - Chemical Stability & Reactivity Information ***

Stability Stable under normal conditions of use, storage, and transportation.

Conditions to Avoid

In powder form, can react with strong oxidizers such as concentrated nitric acid. Molten metal can react violently/explosively with water or moisture, particularly when the water is entrapped.

*** Section 11 - Toxicological Information ***

Health Effects Associated with Individual Ingredients

Cobalt Can cause irritation of eyes, skin and respiratory tract. Skin contact: Can cause allergic reactions. Acute and chronic overexposures: Can cause respiratory sensitization, asthma, scarring of the lungs (pulmonary fibrosis) and damage to the heart muscle (cardiomyopathy). **Cobalt and certain cobalt compounds** IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Chromium dust and mist Can cause irritation of eyes, skin and respiratory tract. **Chromium and trivalent chromium** IARC/NTP: Listed as "unclassifiable as to carcinogenicity in humans" by IARC (Group 3).

Nickel dust and fumes Can cause irritation of eyes, skin and respiratory tract. Eye contact: Can cause inflammation of the eyes and eyelids (conjunctivitis). Skin contact: Can cause sensitization and allergic contact dermatitis. Chronic overexposures: Can cause perforation of the nasal septum, inflammation of the nasal passages (sinusitis), respiratory sensitization, asthma and scarring of the lungs (pulmonary fibrosis). **Nickel alloys** IARC/NTP: Reviewed but not recommended for listing by the NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Tungsten dust Can cause irritation of eyes, skin and upper respiratory tract.

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Molybdenum dust and fumes Can cause irritation of mucous membranes, skin and respiratory tract. Acute overexposures: Can cause headache, backache and sore joints. Chronic overexposures: Can cause deformities of the joints, blood disorders, kidney damage, lung damage and liver damage.

Tantalum and tantalum oxide Can cause mechanical irritation of eyes, skin and upper respiratory tract. Generally of low toxicity.

Manganese dust or fumes Chronic overexposures: Can cause inflammation of the lung tissue, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Aluminum dust, fines and fumes Low health risk by inhalation. Generally considered to be biologically inert.

Niobium dust and fumes Acute overexposures: Generally of low toxicity. Chronic overexposures: Can cause lung damage.

Silicon, inert dusts Chronic overexposures: Can cause chronic bronchitis and narrowing of the airways.

Health Effects Associated with Individual Compounds Formed During Processing

(The following could be expected if welded, remelted or otherwise processed at elevated temperatures.)

Hexavalent chromium (Chrome VI) Can cause irritation of eyes, skin and respiratory tract. Skin contact: Can cause irritant dermatitis, allergic reactions and skin ulcers. Chronic overexposures: Can cause perforation of the nasal septum, respiratory sensitization, asthma, the accumulation of fluid in the lungs (pulmonary edema), lung damage, kidney damage, lung cancer, nasal cancer and cancer of the gastrointestinal tract. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*.

Nickel compounds Associated with lung cancer, cancer of the vocal cords and nasal cancer. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*.

Iron oxide Chronic overexposures: Can cause benign lung disease (siderosis). Ingestion: Can cause irritation of gastrointestinal tract, bleeding, changes in the pH of the body fluids (metabolic acidosis) and liver damage.

Molybdenum trioxide Can cause irritation of eyes, mucous membranes and upper respiratory tract. Chronic overexposures: Can cause reduction in the number of red blood cells (anemia), predisposition to gout, thyroid function changes, liver damage and lung damage. Additional information: Studies with experimental animals by inhalation have found lung cancer.

Vanadium pentoxide Can cause irritation of eyes, skin and respiratory tract. Skin contact (prolonged or repeated): Can cause sensitization and dermatitis. Acute overexposures: Can cause inflammation of the eyes and eyelids (conjunctivitis), bronchitis and the accumulation of fluid in the lungs (pulmonary edema). Effects can be delayed for several days. Chronic overexposures: Can cause kidney damage, blindness, asthma and emphysema. IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Manganese oxide fumes Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever).

Alumina (aluminum oxide) Low health risk by inhalation. Generally considered to be biologically inert.

Silica, amorphous Acute overexposures: Can cause dryness of eyes, nose and upper respiratory tract.

Acute Toxicity of Ingredients/Formed Compounds

A: General Product Information No information available for product.

B: Component Analysis - LD50/LC50

Cobalt (7440-48-4) Inhalation LC50 Rat: >10 mg/L/1H; Oral LD50 Rat:6170 mg/kg

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Nickel (7440-02-0) Oral LD50 Rat: >9000 mg/kg
Iron (7439-89-6) Oral LD50 Rat: 984 mg/kg
Manganese (7439-96-5) Oral LD50 Rat: 9 g/kg
Silicon (7440-21-3) Oral LD50 Rat: 3160 mg/kg
Carbon (7440-44-0) Oral LD50 Rat: >10000 mg/kg

C: Formed Compound Toxicity - LD50s/LC50s

Iron oxide (1309-37-1) Oral LD50 Rat: >10000 mg/kg
Tantalum oxide (1314-61-0) Oral LD50 Rat: 8 g/kg
Vanadium pentoxide (1314-62-1)
 Inhalation LC50 Rat: 2.21 mg/L/4H; Oral LD50 Rat: 10 mg/kg; Dermal LD50 Rat: >2500 mg/kg
Aluminum oxide (1344-28-1) Oral LD50 Rat: >5000 mg/kg
Silicon dioxide (amorphous) (69012-64-2)
 Oral LD50 Rat: >5000 mg/kg; Inhalation LC50 Rat: >2.2 mg/L/1H; Dermal LD50 Rabbit: >2000 mg/kg (related to Silica, amorphous)

Carcinogenicity of Ingredients

A: Ingredient Carcinogenicity - IARC/NTP

Component	CAS	IARC 1	IARC 2A	IARC 2B	IARC 3	IARC 4	NTP K	NTP RA
Cobalt	7440-48-4	No	No	Yes	No	No	No	No
Chromium	7440-47-3	No	No	No	Yes	No	No	No
Nickel	7440-02-0	No	No	Yes	No	No	No	No

B: Ingredient Carcinogenicity - ACGIH

Cobalt (7440-48-4)
 ACGIH A3 - Confirmed animal carcinogen with unknown relevance to humans
Chromium (7440-47-3)
 ACGIH A4 - Not Classifiable as a Human Carcinogen
Nickel (7440-02-0)
 ACGIH A5 - Not Suspected as a Human Carcinogen

C: Ingredient References

Cobalt (7440-48-4)
 IARC Monograph 86 [2006] (without tungsten carbide), Monograph 52 [1991]
Chromium (7440-47-3)
 IARC Monograph 49 [1990] (listed under Chromium and Chromium compounds), Supplement 7 [1987]
Nickel (7440-02-0)
 IARC Monograph 49 [1990], Supplement 7 [1987]

Carcinogenicity of Compounds Formed During Processing

A: Formed Compound Carcinogenicity - IARC/NTP

Component	CAS	IARC 1	IARC 2A	IARC 2B	IARC 3	IARC 4	NTP K	NTP RA
Chromium (III) Compounds	Not Available	No	No	No	Yes	No	No	No
Chromium (VI) compounds (certain water insoluble forms)	Not Available	Yes	No	No	No	No	Yes	No
Nickel compounds	Not Available	Yes	No	No	No	No	Yes	No
Iron oxide	1309-37-1	No	No	No	Yes	No	No	No
Vanadium pentoxide	1314-62-1	No	No	Yes	No	No	No	No
Silicon dioxide (amorphous) (related to Silica, amorphous)	69012-64-2	No	No	No	Yes	No	No	No

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B: Formed Compound Carcinogenicity - ACGIH

Chromium (III) Compounds (Not Available)

ACGIH A4 - Not Classifiable as a Human Carcinogen

Chromium (VI) compounds- water soluble (Not Available)

ACGIH A1 - Confirmed Human Carcinogen

Chromium (VI) compounds (certain water insoluble forms) (Not Available)

ACGIH A1 - Confirmed Human Carcinogen

Nickel insoluble compounds (Not Available)

ACGIH A1 - Confirmed Human Carcinogen

Iron oxide (1309-37-1)

ACGIH A4 - Not Classifiable as a Human Carcinogen

Vanadium pentoxide (1314-62-1)

ACGIH A4 - Not Classifiable as a Human Carcinogen (dust and fume)

Aluminum oxide (1344-28-1)

ACGIH A4 - Not Classifiable as a Human Carcinogen

C: Formed Compound References

Chromium (III) Compounds (Not Available)

IARC Monograph 49 [1990] (listed under Chromium and Chromium compounds),
Supplement 7 [1987]

Chromium (VI) compounds (certain water insoluble forms) (Not Available)

IARC Monograph 49 [1990] (evaluated as a group)

Chromium (VI) (18540-29-9)

IARC Monograph 49 [1990] (evaluated as a group)

Nickel compounds (Not Available)

IARC Monograph 49 [1990] (evaluated as a group)

Iron oxide (1309-37-1)

IARC Supplement 7 [1987], Monograph 1 [1972]

Vanadium pentoxide (1314-62-1)

IARC Monograph 86 [2006]

Silicon dioxide (amorphous) (69012-64-2)

IARC Monograph 68 [1997], Supplement 7 [1987] (related to Silica, amorphous)

Descriptions of IARC and NTP Classifications

IARC 1: The agent is carcinogenic to humans. There is sufficient evidence that a causal relationship existed between exposure to the agent and human cancer.

IARC 2A: The agent is probably carcinogenic to humans. Generally includes agents for which there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

IARC 2B: The agent is possibly carcinogenic to humans. Generally includes agents for which there is limited evidence in humans and less than sufficient evidence in experimental animals.

IARC 3: The agent is not classifiable as to its carcinogenicity to humans. Generally includes agents for which there is inadequate evidence in humans and inadequate or limited evidence in experimental animals.

IARC 4: The agent is probably not carcinogenic to humans. Generally includes agents for which there is evidence suggesting lack of carcinogenicity in humans and in experimental animals.

NTP K: Known to be a human carcinogen.

NTP RA: Reasonably anticipated to be a human carcinogen.

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information No information available for product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Cobalt (7440-48-4) 96 Hr LC50 Brachydanio rerio: >100 mg/L [static]

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Nickel (7440-02-0)

96 Hr LC50 Oncorhynchus mykiss: 31.7 mg/L (adult); 96 Hr LC50 Pimephales promelas: 3.1 mg/L; 96 Hr LC50 Brachydanio rerio: >100 mg/L

72 Hr EC50 freshwater algae (4 species): 0.1 mg/L; 72 Hr EC50 Selenastrum capricornutum: 0.18 mg/L

96 Hr EC50 water flea: 510 µg/L

Iron (7439-89-6) 96 Hr LC50 Morone saxatilis: 13.6 mg/L [static]

Environmental Fate No information available for product.

*** Section 13 - Disposal Considerations ***

Disposal Instructions Reuse or recycle material whenever possible.

US EPA Waste Number & Descriptions

A: General Product Information

If reuse or recycle is not possible, then characterize in accordance with applicable regulations (40 CFR 261 or state equivalent in the U.S.) prior to disposal. TCLP testing is recommended for chromium.

B: Component Waste Numbers

RCRA waste codes other than described under Section A may apply depending on use of product. Refer to 40 CFR 261 or state equivalent in the U.S.

*** Section 14 - Transportation Information ***

Special Transportation

	PSN #1	PSN #2	PSN #3	PSN #4
Notes:	(1)			
UN NA Number:	-			
Proper Shipping Name:	Not regulated			
Hazard Class:	-			
Packing Group:	-			
RQ:	-			
Other - Tech Name:	-			
Other - Marine Pollutant:	-			

Notes:

- (1) When "Not regulated," enter the proper freight classification, "MSDS Number," and "Product Name" on the shipping paperwork.

Canadian Controlled Products Regulation PIN:	Not regulated
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*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Cobalt (7440-48-4)

SARA 313: 0.1 % de minimis concentration

Chromium (7440-47-3)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers);
2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

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Nickel (7440-02-0)

SARA 313: 0.1 % de minimis concentration

CERCLA: 100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

Vanadium (7440-62-2)

SARA 313: 1.0 % de minimis concentration (except when contained in an alloy)

Manganese (7439-96-5)

SARA 313: 1.0 % de minimis concentration

Aluminum (7429-90-5)

SARA 313: 1.0 % de minimis concentration (dust or fume only)

SARA 311/312 Physical and Health Hazard Categories:

Immediate (acute) Health Hazard: Yes, if particulates/fumes generated during processing

Delayed (chronic) Health Hazard: Yes, if particulates/fumes generated during processing

Fire Hazard: No

Sudden Release of Pressure: No

Reactive: No

State Regulations

A: General Product Information PENNSYLVANIA "Special Hazardous Substance": Chromium, Nickel

Chemical(s) known to the State of California to cause cancer: Chromium (hexavalent compounds), Cobalt metal powder, Nickel (metallic) and nickel compounds

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Cobalt	7440-48-4	Yes	No	Yes	Yes	Yes	Yes
Chromium	7440-47-3	Yes	No	Yes	Yes	Yes	Yes
Nickel	7440-02-0	Yes	No	Yes	Yes	Yes	Yes
Tungsten	7440-33-7	Yes	No	Yes	Yes	Yes	Yes
Iron	7439-89-6	Yes	No	No	No	No	No
Molybdenum	7439-98-7	Yes	No	Yes	Yes	Yes	Yes
Tantalum	7440-25-7	Yes	No	Yes	Yes	Yes	Yes
Vanadium	7440-62-2	Yes	No	Yes	No	Yes	Yes
Manganese	7439-96-5	Yes	No	Yes	Yes	Yes	Yes
Aluminum	7429-90-5	Yes	No	Yes	Yes	Yes	Yes
Silicon	7440-21-3	No	No	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Other Regulations

A: General Product Information Material meets the criteria for inclusion in WHMIS Class D2A.

B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Cobalt	7440-48-4	0.1 %
Chromium	7440-47-3	0.1 %
Nickel	7440-02-0	0.1 %
Tungsten	7440-33-7	1 %
Molybdenum	7439-98-7	1 %
Tantalum	7440-25-7	1 %
Vanadium	7440-62-2	1 %
Manganese	7439-96-5	1 %
Aluminum	7429-90-5	1 %

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C: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS	AUST.	MITI
Cobalt	7440-48-4	Yes	Yes	Yes	Yes	No
Chromium	7440-47-3	Yes	Yes	Yes	Yes	No
Nickel	7440-02-0	Yes	Yes	Yes	Yes	No
Tungsten	7440-33-7	Yes	Yes	Yes	Yes	No
Iron	7439-89-6	Yes	Yes	Yes	Yes	No
Molybdenum	7439-98-7	Yes	Yes	Yes	Yes	No
Tantalum	7440-25-7	Yes	Yes	Yes	Yes	No
Vanadium	7440-62-2	Yes	Yes	Yes	Yes	No
Manganese	7439-96-5	Yes	Yes	Yes	Yes	No
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	No
Niobium	7440-03-1	Yes	Yes	Yes	Yes	No
Silicon	7440-21-3	Yes	Yes	Yes	Yes	No
Carbon	7440-44-0	Yes	Yes	Yes	Yes	No

Inventory information

MITI Inventory: Pure metals are not specifically listed by CAS or MITI number on the MITI Inventory. However, the class of compounds for each of these metals is listed.

*** Section 16 - Other Information ***

MSDS History

Original: June 18, 2001

Supersedes: October 11, 2004

Revised: April 22, 2008

MSDS Status

04/22/2008: Reviewed on a periodic basis in accordance with Alcoa policy. Changes in Sections 1, 2, 3, 4, 5, 8, 11, 12, 13, 14 & 15.

10/11/2004: Combined with Alcoa MSDS #'s 1148 and 1149. Changes in Sections 1, 2, 3, 8 and 15. Covers some products formerly on Howmet MSDSs 201, 202, 203, 204, 205, 206 and 504.

06/18/2001: New MSDS; covers some products formerly on Howmet MSDS 201.

Prepared By

Hazardous Materials Control Committee

Preparer: Stephanie Williams, 412-553-1479/Jon N. Peace, 412-553-2293

MSDS System Number

159242

Other Information

* Guide to Occupational Exposure Values-2007, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).

* Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).

* NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, February 2004.

* Patty's Industrial Hygiene and Toxicology: Volume II: Toxicology, 4th ed., 1994, Patty, F. A.; edited by Clayton, G. D. and Clayton, F. E.: New York: John Wiley & Sons, Inc.

* expub, www.expub.com, Expert Publishing, LLC.

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Key-Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EC	Effective Concentration
ED	Effective Dose
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	Environmental Protection Act
IARC	International Agency for Research on Cancer
LC ₅₀	Lethal concentration (50 percent kill)
LC _{Lo}	Lowest published lethal concentration
LD ₅₀	Lethal dose (50 percent kill)
LD _{Lo}	Lowest published lethal dose
LFL	Lower Flammable Limit
MITI	Ministry of International Trade & Industry
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NORM	Naturally Occurring Radioactive Materials
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PIN	Product Identification Number
PSN	Proper Shipping Name
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average
UFL	Upper Flammable Limit
WHMIS	Workplace Hazardous Materials Information System
atm	atmosphere
cm	centimeter
g, gm	gram
in	inch
kg	kilogram
lb	pound
m	meter
mg	milligram
ml, ML	milliliter
mm	millimeter
mppcf	million particles per cubic foot
n.o.s.	not otherwise specified
ppb	parts per billion
ppm	parts per million
psia	pounds per square inch absolute
u	micron
ug	microgram

INFORMATION HEREIN IS GIVEN IN GOOD FAITH AS AUTHORITATIVE AND VALID; HOWEVER, NO WARRANTY, EXPRESS OR IMPLIED, CAN BE MADE.

This is the end of MSDS # 1147

COBALT-BASED ALLOYS



WARNING

Physical Hazards: Non-combustible as supplied. Dust and fines from processing may be ignitable. Explosion/fire hazards may be present when (1) molten metal is in contact with water or moisture or (2) heavily concentrated dust clouds are dispersed in air.

Health Hazards: Health effects generally expected in cases of overexposures:

EYES: Dust or fume from processing: Can cause irritation.

SKIN: Dust or fume from processing: Can cause irritation, sensitization and allergic contact dermatitis.

INHALATION: Health effects from mechanical processing (e.g., cutting, grinding): Can cause upper respiratory tract irritation. **Chronic overexposures:** Can cause asthma, respiratory sensitization, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males. Additional health effects from elevated temperature processing (e.g., welding, melting): **Acute overexposures:** Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever). **Chronic overexposures:** Can cause the accumulation of fluid in the lungs (pulmonary edema) and lung cancer.

WARNING: Cobalt metal powder, Chromium (hexavalent compounds) and nickel (metallic) and nickel compounds are chemicals known to the State of California to cause cancer (Proposition 65).

Precautions: Avoid generating dust. Use with adequate ventilation. Keep material dry. Use appropriate personal protective equipment (safety glasses/gloves) to avoid injury. Use appropriate NIOSH approved respiratory protection (N95) if concentrations exceed the permissible limits.

First Aid (dust or fume from processing): EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician. SKIN: Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists. INHALATION: Remove to fresh air. If unconscious or severely injured, check for clear airway, breathing and presence of pulse. Perform CPR if there is no pulse or respiration. Consult a physician.

In case of fire: Use a Class D agent, fluxing salts, graphite or dry sand on dust or fine fires. Otherwise, use fire fighting methods and materials that are appropriate for surrounding fire. Do NOT use water around molten metal. This will react with the burning material.

Read Alcoa Material Safety Data Sheet No. 1147 for more information about use and disposal.

Emergency Phone: (412) 553-4001.

INGREDIENTS:	CAS No:
Cobalt	(7440-48-4)
Chromium	(7440-47-3)
Nickel	(7440-02-0)
Tungsten	(7440-33-7)
Iron	(7439-89-6)
Molybdenum	(7439-98-7)
Tantalum	(7440-25-7)

INGREDIENTS:	CAS No:
Vanadium	(7440-62-2)
Manganese	(7439-96-5)
Aluminum	(7429-90-5)
Niobium	(7440-03-1)
Silicon	(7440-21-3)
Carbon	(7440-44-0)

Alcoa Inc.

201 Isabella Street, Pittsburgh, PA 15212-5858 USA

4/08 1147



SAFETY DATA SHEET

Version 4.8
Revision Date 12/01/2015
Print Date 05/13/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Cumene

Product Number : 36698
Brand : Sigma-Aldrich
Index-No. : 601-024-00-X

CAS-No. : 98-82-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: Isopropylbenzene
Formula	: C ₉ H ₁₂
Molecular weight	: 120.19 g/mol
CAS-No.	: 98-82-8
EC-No.	: 202-704-5
Index-No.	: 601-024-00-X

Hazardous components

Component	Classification	Concentration
Cumene		
	Flam. Liq. 3; Carc. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2; H226, H304, H335, H351, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Cumene	98-82-8	TWA	50.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Skin irritation		
		TWA	50.000000 ppm 245.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	50.000000 ppm 245.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: liquid, clear Colour: colourless
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: -96 °C (-141 °F) - lit.
f) Initial boiling point and boiling range	152 - 154 °C (306 - 309 °F) - lit.
g) Flash point	31.0 °C (87.8 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 6.5 %(V) Lower explosion limit: 0.9 %(V)
k) Vapour pressure	10.7 hPa (8.0 mmHg) at 20.0 °C (68.0 °F)
l) Vapour density	No data available
m) Relative density	0.864 g/cm ³ at 25 °C (77 °F)
n) Water solubility	0.06 g/l at 25 °C (77 °F) - slightly soluble
o) Partition coefficient: n-octanol/water	log Pow: 3.55 at 23 °C (73 °F)
p) Auto-ignition temperature	425.0 °C (797.0 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Surface tension	27.69 mN/m at 25 °C (77 °F)
-----------------	-----------------------------

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 2,260 mg/kg

Inhalation: No data available

Dermal: No data available

NOAEL Feed - Rat - male - > 535.8 mg/kg

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

(OECD Test Guideline 405)

Respiratory or skin sensitisation

- Guinea pig

Result: Did not cause sensitisation on laboratory animals.

(OECD Test Guideline 406)

Germ cell mutagenicity

in vitro assay

S. typhimurium

Result: negative

Mutagenicity (micronucleus test)

Mouse - male and female

Result: negative

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Cumene)

NTP: Reasonably anticipated to be a human carcinogen (Cumene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Additional Information

RTECS: GR8575000

narcosis, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Damage to the lungs., Liver injury may occur., Kidney injury may occur.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 4.8 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia (water flea) - 2.14 mg/l - 48 h (OECD Test Guideline 202)

Toxicity to algae EC50 - Pseudokirchneriella subcapitata (green algae) - 2.60 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: - According to the results of tests of biodegradability this product is not readily biodegradable.

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1918 Class: 3 Packing group: III

Proper shipping name: Isopropylbenzene

Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1918 Class: 3 Packing group: III EMS-No: F-E, S-E

Proper shipping name: ISOPROPYLBENZENE

Marine pollutant: yes

IATA

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
Cumene	98-82-8	2010-06-11

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation

Product Safety – Americas Region

1-800-521-8956

Version: 4.8

Revision Date: 12/01/2015

Print Date: 05/13/2016

SAFETY DATA SHEET

Version 5.8
Revision Date 03/07/2015
Print Date 02/23/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Cyclohexane

Product Number : 320633
Brand : Aldrich
Index-No. : 601-017-00-1

CAS-No. : 110-82-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225

Skin irritation (Category 2), H315

Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

Aspiration hazard (Category 1), H304

Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225

Highly flammable liquid and vapour.

H304

May be fatal if swallowed and enters airways.

H315

Causes skin irritation.

H336

May cause drowsiness or dizziness.

H400

Very toxic to aquatic life.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₆ H ₁₂
Molecular weight	: 84.16 g/mol
CAS-No.	: 110-82-7
EC-No.	: 203-806-2
Index-No.	: 601-017-00-1

Hazardous components

Component	Classification	Concentration
Cyclohexane		
	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 1; H225, H304, H315, H336, H400	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters**

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Cyclohexane	110-82-7	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment		
		TWA	300.000000 ppm 1,050.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	300.000000 ppm 1,050.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 35 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Colour: colourless
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 4 - 7 °C (39 - 45 °F) - lit.
f) Initial boiling point and boiling range	80.7 °C (177.3 °F) - lit.
g) Flash point	-17.99 °C (-0.38 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 9 %(V) Lower explosion limit: 1 %(V)
k) Vapour pressure	225.0 hPa (168.8 mmHg) at 37.7 °C (99.9 °F) 102.7 hPa (77.0 mmHg) at 20.0 °C (68.0 °F)
l) Vapour density	No data available
m) Relative density	0.779 g/cm ³ at 25 °C (77 °F)
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 3.44
p) Auto-ignition temperature	260.0 °C (500.0 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 12,705 mg/kg

LC50 Inhalation - Rat - 4 h - 34,000 mg/l
(OECD Test Guideline 403)

LD50 Dermal - Rabbit - > 2,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Additional Information

RTECS: GU6300000

Central nervous system depression, Drowsiness, Irritability, Dizziness, Gastrointestinal disturbance, Lung irritation, chest pain, pulmonary edema

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish flow-through test LC50 - Pimephales promelas (fathead minnow) - 4.53 mg/l -

96 h
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates Immobilization EC50 - Daphnia magna (Water flea) - 0.9 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to algae EC50 - Pseudokirchneriella subcapitata (green algae) - 3.4 mg/l - 72 h
(OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability Result: - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1145 Class: 3 Packing group: II
Proper shipping name: Cyclohexane
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1145 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: CYCLOHEXANE
Marine pollutant: yes

IATA

UN number: 1145 Class: 3 Packing group: II
Proper shipping name: Cyclohexane

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

Cyclohexane	CAS-No. 110-82-7	Revision Date 2007-07-01
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Pennsylvania Right To Know Components

Cyclohexane	CAS-No. 110-82-7	Revision Date 2007-07-01
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New Jersey Right To Know Components

Cyclohexane	CAS-No. 110-82-7	Revision Date 2007-07-01
-------------	---------------------	-----------------------------

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Aquatic Acute	Acute aquatic toxicity
Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8

Revision Date: 03/07/2015

Print Date: 02/23/2016

SAFETY DATA SHEET

Version 5.4
Revision Date 11/12/2015
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Dibromofluoromethane solution

Product Number : 48077

Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Specific target organ toxicity - single exposure (Category 1), H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225

Highly flammable liquid and vapour.

H301 + H311 + H331

Toxic if swallowed, in contact with skin or if inhaled

H370

Causes damage to organs.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242

Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P311	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P307 + P311	IF exposed: Call a POISON CENTER or doctor/ physician.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Hazardous components

Component		Classification	Concentration
Methanol			
CAS-No.	67-56-1	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301 + H311 + H331, H370	>= 90 - <= 100 %
EC-No.	200-659-6		
Index-No.	603-001-00-X		
Registration number	01-2119433307-44-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations.

Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Headache Nausea Dizziness		

		Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		TWA	200.000000 ppm 260.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250.000000 ppm 325.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200.000000 ppm 260.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		TWA	200 ppm 260 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250 ppm 325 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200 ppm 260 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

		STEL	250 ppm 325 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	200 ppm 260 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methanol	15 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm

Break through time: 480 min

Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Colour: colourless
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	-98 °C (-144 °F)
f) Initial boiling point and boiling range	64 - 65 °C (147 - 149 °F) at 1,013 hPa (760 mmHg)
g) Flash point	11 °C (52 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 36 %(V) Lower explosion limit: 6 %(V)
k) Vapour pressure	130.23 hPa (97.68 mmHg) at 20 °C (68 °F) 547 hPa (410 mmHg) at 50 °C (122 °F)
l) Vapour density	0.791.1
m) Relative density	0.791 g/cm ³
n) Water solubility	completely miscible
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	0.79 1.1
-------------------------	-------------

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

acids, Acid chlorides, Acid anhydrides, Oxidizing agents, Alkali metals

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Methyl alcohol may be fatal or cause blindness if swallowed., Cannot be made non-poisonous., Effects due to ingestion may include:, Nausea, Headache, Vomiting, Gastrointestinal disturbance, Dizziness, Weakness, Confusion., Drowsiness, Unconsciousness, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1230 Class: 3 Packing group: II
Proper shipping name: Methanol, solution
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

UN number: 1230 Class: 3 (6.1) Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHANOL, SOLUTION

IATA

UN number: 1230 Class: 3 (6.1) Packing group: II
Proper shipping name: Methanol, solution

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Pennsylvania Right To Know Components

CAS-No.	Revision Date
---------	---------------

Methanol	67-56-1	2007-07-01
New Jersey Right To Know Components		
Methanol	CAS-No. 67-56-1	Revision Date 2007-07-01
California Prop. 65 Components		
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	CAS-No. 67-56-1	Revision Date 2012-03-16
Methanol		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H370	Causes damage to organs.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0
Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4

Revision Date: 11/12/2015

Print Date: 06/21/2016

Bis(2-ethylhexyl) phthalate

sc-254975

Material Safety Data Sheet



The Power to Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

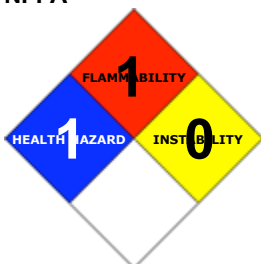
PRODUCT NAME

Bis(2-ethylhexyl) phthalate

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY:

ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C24-H38-O4, "1, 2-benzenecarboxylic acid, bis(2-ethylhexyl) ester", "bis(2-ethylhexyl)-1, 2-benzenedicarboxylate", "bis(2-ethylhexyl) phthalate", "dioctyl phthalate", di(2-ethylhexyl)orthophthalate, DEHP, "di(2-ethylhexyl) phthalate", "2-ethylhexyl phthalate", "phthalic acid dioctyl ester", "Bisoflex 81", "Bisoflex DOP", "Compound 889", "Ergoplast FDO", "Eviplast 80, 81", Fleximel, "Flexol DOP", "Good-rite GP-264", "Hatcol DOP", "Hercoflex 260", "Jayflex DOP", "Kodaflex DOP", "Mollan O", NCI-C52733, "Nuoplaz DOP", Octoil, "Palatinol AM", "Platinol DOP", "RC Plasticizer DOP", "Reomol DOP", "Reomol D-79P", "Sicol 150", "Staflex DOP", "Truflex DOP", "Vestitol AH", "Vinicizer 80", "Witcizer 312", "plasticiser/ plasticizer", "Era Polymers DOP"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	1		
Reactivity:	1		
Chronic:	3		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Limited evidence of a carcinogenic effect.
May impair fertility.
May cause harm to the unborn child.
May cause long-term adverse effects in the environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Accidental ingestion of the material may be damaging to the health of the individual.
 - The toxicity of phthalates is not excessive due to slow oral absorption and metabolism.
- Absorption is affected by fat in the diet.

EYE

- Although the liquid is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn).

SKIN

- The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis.

The material is unlikely to produce an irritant dermatitis as described in EC Directives .

- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models).
- Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
- Inhalation hazard is increased at higher temperatures.
 - Not normally a hazard due to non-volatile nature of product.

CHRONIC HEALTH EFFECTS

- There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.
- Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material.

Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material.

Results in experiments suggest that this material may cause disorders in the development of the embryo or fetus, even when no signs of poisoning show in the mother.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

For di-sec-octyl phthalate:

Oral studies of 90-days to 2-years in rat, 1-year in guinea pig and up to 1-year in dog have shown a no-effect level of about 60 mg/kg/day. Higher doses produced growth retardation and increased weights of livers and kidneys.

Rats and mice fed on diets containing 6000-12000 (rats) and 3000-6000 (mice) mg/kg body weight for 103 weeks showed an increased incidence of hepatocellular carcinomas in female rats and male and female mice, and an increased incidence of either hepatocellular carcinomas or neoplastic nodules in male rats. About 35% of the hepatocellular carcinomas in mice had metastasised to the lungs.

The substance can cause testicular damage in rats (dietary and gavage studies) with a no-effect level in 0.3% to 0.5% in the diet. Inhalation or dermal exposures did not produce testicular effects. When the substance was fed to pregnant rats (5 ml/kg) it produced slight effects on embryonic and foetal development with skeletal abnormalities more common.

Exposure to phthalates over years leads to pain, numbness and spasms in the hands and feet. Many people have developed multiple disorders in the nervous system and the balancing system.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
di-sec-octyl phthalate	117-81-7	>99

Section 4 - FIRST AID MEASURES

SWALLOWED

· If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE

■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs: · Flush skin and hair with running water (and soap if available). · Seek medical attention in event of irritation.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Other measures are usually unnecessary.

NOTES TO PHYSICIAN

■ Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	1.275 @ 200 C
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	0.99 @ 20 C
Lower Explosive Limit (%):	0.3

EXTINGUISHING MEDIA

· Foam.
· Dry chemical powder.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible.
· Slight fire hazard when exposed to heat or flame.
Combustion products include: carbon dioxide (CO₂), other pyrolysis products typical of burning organic material.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Safety Glasses.
Chemical goggles.
Gloves:
1.VITON 2.BUTYL 3.NITRILE
Respirator:
Type A-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■ Environmental hazard - contain spillage.
· Remove all ignition sources.
· Clean up all spills immediately.

MAJOR SPILLS

■ Environmental hazard - contain spillage.
Moderate hazard.
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

- Metal can or drum
- Packing as recommended by manufacturer.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
US - Minnesota Permissible Exposure Limits (PELs)	di-sec-octyl phthalate (Di-sec octyl phthalate (Di-2-ethylhexyl-phthalate))		5		10				
US ACGIH Threshold Limit Values (TLV)	di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate [DEHP])		5						TLV Basis: lower respiratory tract irritation
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	di-sec-octyl phthalate (Di-sec-octyl phthalate)		5		10				
US OSHA Permissible Exposure Levels (PELs) - Table Z1	di-sec-octyl phthalate (Di-sec octyl phthalate (Di-(2-ethylhexyl) phthalate))		5						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	di-sec-octyl phthalate (Di-sec octyl phthalate (Di-2-ethylhexyl-phthalate))		5						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	di-sec-octyl phthalate (Di-sec octyl phthalate (Di-2-ethylhexyl-phthalate))		5		10				
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	di-sec-octyl phthalate (Di-sec octyl phthalate (Di-2-ethylhexyl-phthalate))		5		10				

US - California Permissible Exposure Limits for Chemical Contaminants	di-sec-octyl phthalate (Di-sec-octyl phthalate; bis(2 ethylhexyl) phthalate)	5			
US - Idaho - Limits for Air Contaminants	di-sec-octyl phthalate (Di-sec, octyl phthalate (Di-(2-ethylhexyl)phthalate))	5			
US - Hawaii Air Contaminant Limits	di-sec-octyl phthalate (Di-sec-octyl phthalate (Di-2-ethylhexyl- phthalate))	5		10	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	di-sec-octyl phthalate (Di-sec, octyl phthalate (Di-2-ethylhexyl phthalate or DEHP))	5		10	T20
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	di-sec-octyl phthalate (Di-sec, octyl phthalate (Di-2-ethylhexylphthalate)	5	-	10	
US - Washington Permissible exposure limits of air contaminants	di-sec-octyl phthalate (Di-sec, Octyl phthalate (Di-2-ethylhexylphthalate))	5		10	
US - Alaska Limits for Air Contaminants	di-sec-octyl phthalate (Di-sec-octyl phthalate (Di-2-ethylhexylphthalate))	5		10	
Canada - Prince Edward Island Occupational Exposure Limits	di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate [DEHP])	5			TLV Basis: lower respiratory tract irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	di-sec-octyl phthalate (Di-sec octyl phthalate (Di-(2-ethylhexyl) phthalate))	5			
Canada - Nova Scotia Occupational Exposure Limits	di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate [DEHP])	5			TLV Basis: lower respiratory tract irritation
US - Michigan Exposure Limits for Air Contaminants	di-sec-octyl phthalate (Di-sec-octyl phthalate[Di(2-ethylhexyl)phthalate])	5		10	
Canada - Northwest Territories Occupational Exposure Limits (English)	di-sec-octyl phthalate (Di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate))	5		10	

Canada - British Columbia Occupational Exposure Limits	di-sec-octyl phthalate (Diesel fuel, as total hydrocarbons, Inhalable)	100 (V)			Skin
Canada - British Columbia Occupational Exposure Limits	di-sec-octyl phthalate (Kerosene /Jet fuels, as total hydrocarbon vapour, Revised 2003)	200 (P)			Skin
Canada - Alberta Occupational Exposure Limits	di-sec-octyl phthalate (Diesel fuel, as total hydrocarbons)	100			
Canada - Alberta Occupational Exposure Limits	di-sec-octyl phthalate (Kerosene/Jet fuels, as total hydrocarbon vapour)	200			
Canada - British Columbia Occupational Exposure Limits	di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate (DEHP))	5			
Canada - Ontario Occupational Exposure Limits	di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate (DEHP) / Phtalate de dioctyle secondaire (DEHP))	3	5		
Canada - Alberta Occupational Exposure Limits	di-sec-octyl phthalate (Di(2-ethylhexyl)phthalate (DEHP, Di-sec-octyl phthalate))	5			
US - Oregon Permissible Exposure Limits (Z-1)	di-sec-octyl phthalate (Di-sec, octyl phthalate (Di-2-ethylhexylphthalate))	5			
US NIOSH Recommended Exposure Limits (RELs)	di-sec-octyl phthalate (Di-sec octyl phthalate)	5	10		See Appendix A; Ca

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

- type a-p filter of sufficient capacity.

EYE

- Safety glasses with side shields
- Chemical goggles.

HANDS/FEET

- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes

according to EN 374) is recommended.

- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- Neoprene rubber gloves.

Wear chemical protective gloves, eg. PVC.

OTHER

- Overalls.

- P.V.C. apron.

- Barrier cream.

- Skin cleansing cream.

- Eye wash unit.

ENGINEERING CONTROLS

■ General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

Does not mix with water.

Floats on water.

State	Liquid	Molecular Weight	390.54
Melting Range (°F)	-67	Viscosity	Not Available
Boiling Range (°F)	725	Solubility in water (g/L)	Insoluble
Flash Point (°F)	426	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	734	Vapor Pressure (mmHg)	1.275 @ 200 C
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	0.99 @ 20 C
Lower Explosive Limit (%)	0.3	Relative Vapor Density (air=1)	13.45
Volatile Component (%vol)	Not available	Evaporation Rate	Very Slow

APPEARANCE

Light-coloured, odourless and oily liquid; insoluble in water; Mixes with mineral oil and most organic solvents.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.

- Product is considered stable.

STORAGE INCOMPATIBILITY

■ Phthalates:

- react with strong acids, strong oxidisers, permanganates and nitrates

- attack some form of plastics.

Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

di-sec-octyl phthalate

TOXICITY AND IRRITATION

DI-SEC-OCTYL PHTHALATE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 30000 mg/kg	Skin (rabbit): 500 mg/24h Mild
Oral (human) TDLo: 143 mg/kg	Eye (rabbit): 500 mg/24h Mild
Oral (mouse) LD50: 1500 mg/kg	

Oral (rabbit) LD50: 34000 mg/kg

Dermal (rabbit) LD50: 25000 mg/kg

Oral (guinea pig) LD50: 26000 mg/kg

Dermal (g.pig) LD50: 10000 mg/kg

Intraperitoneal (Rat) LD50: 30700 mg/kg

Intravenous (Rat) LD50: 250 mg/kg

Intravenous (Mouse) LD50: 1060 mg/kg

Oral (Mouse) TDLo: 984.6 mg/kg

■ Di-sec-octyl phthalate (DEHP) is not acutely toxic in small laboratory animals via the oral route. The oral LD50 reported for mice is 26.3 g/kg; for rats, it is 33.8 g/kg. No skin irritation or sensitisation potential has been demonstrated in either animals or humans, and the lethal dermal dose in rabbits is about 25 ml/kg. Deaths in rats and chronic diffuse inflammation of the lung in mice exposed to DEHP at unspecified levels have been reported.

Long-term dietary toxicity studies in rats, guinea pigs, and dogs have established a no-effect dose level of about 60 mg/kg/day, and no carcinogenic or histologic abnormalities were observed at this level. Higher doses were associated with growth retardation and increased liver and kidney weights but not histologic abnormalities. Metabolic studies have demonstrated that laboratory animals do not appreciably metabolise DEHP. Teratogenicity studies in pregnant rats indicated that fertility is unaffected at doses of 0.1, 0.2, or 0.33 percent of the acute intraperitoneal LD50 dose for rats, although slight effects on embryonic and foetal development were observed in these animals; skeletal deformities were the most common teratogenic effects observed. Mutagenic effects were observed at intravenous doses of one-third, one-half, and two-thirds of the acute LD50; these effects are consistent with DEHP's ability to produce dominant lethal mutations.

A study of workers exposed to a mixture of the vapors of diethyl phthalate, dibutyl phthalate, and di-2-ethylhexyl phthalate reported that exposures to 1 to 6 ppm caused no peripheral polyneuritis. However, Russian investigators examined male and female workers exposed to between 1.7 and 66 mg/m³ of various combinations of airborne phthalates (including butyl phthalate, higher aryl phthalates, dioctyl phthalate and others) and noted complaints of pain, numbness, and spasms in the upper and lower extremities after six to seven years of exposure. Polyneuritis was observed in 32 percent of the workers studied, and 78 percent of these workers showed depression of vestibular receptors.

The material may produce peroxisome proliferation. Peroxisomes are single, membrane limited, cytoplasmic organelles that are found in the cells of animals, plants, fungi and protozoa. Peroxisome proliferators include certain hypolipidaemic drugs, phthalate ester plasticisers, industrial solvents, herbicides, food flavours, leukotriene D₄ antagonists and hormones. Numerous studies in rats and mice have demonstrated the hepatocarcinogenic effects of peroxisome proliferators, and these compounds have been unequivocally established as carcinogens. However it is generally conceded that compounds inducing proliferation in rats and mice have little, if any, effect on human liver except at very high doses or extreme conditions of exposure.

The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

Transitional Phthalate Esters: produced from alcohols with straight-chain carbon backbones of C₄ to C₆. This subcategory also includes a phthalate produced from benzyl alcohol as one ester group with the second ester composed of an alkyl group with a C₅ carbon backbone and butyrate group. Phthalate esters containing >10% C₄ to C₆ molecules were conservatively included in this subcategory. Branched C₇ and C₈ isomers (di-iso-heptyl, di-iso-octyl and diethylhexyl phthalates) in contrast to linear dihexyl and dioctyl phthalate are members of this family.

Transitional phthalates have varied uses, but are largely used as plasticisers for PVC. Physicochemical properties also vary in that the lower molecular weight transitional phthalates are more water-soluble than higher molecular weight transitional phthalates, but none would be characterised as highly water soluble. Transitional phthalates have lower water solubility than the low molecular weight phthalates and except for butylbenzyl phthalate (BBP), existing data suggest they do not exhibit acute or chronic aquatic toxicity. What distinguishes some of the transitional phthalates from others is their greater mammalian toxicity potential, particularly with regard to reproductive and developmental effects, compared to either the low or high molecular weight phthalate subcategories.

Acute Toxicity. The available data on phthalates spanning the carbon range from C₄ to C₆ indicate that phthalate esters in the transitional subcategory are minimally toxic by acute oral and dermal administration. The oral LD50 value for BBP exceeds 2 g/kg, and for materials with higher molecular weights, the LD50 values exceed the maximum amounts which can be administered to the animals in a manner consistent with the principles of responsible animal use.

One member of this subcategory, diethylhexyl phthalate (DEHP), has been tested for acute inhalation toxicity. It did not cause an effect at the highest concentration tested. Further, considering the low volatility of these substances, inhalation exposure at toxicologically significant levels is not anticipated.

Repeated Dose Toxicity. Several substances in the C₄ to C₆ range, including BBP, have been tested for repeated dose toxicity in studies ranging from 3 weeks to 2 years. The principal effects found in these studies were those associated with peroxisome proliferation including liver enlargement and induction of peroxisomal enzymes. As shown in a comparative study of liver effects, the strongest inducers of peroxisome proliferation are diisononyl phthalate (DINP) and di-iso-decyl phthalate (DIDP) with substances of shorter chain length (e.g., BBP) showing much less pronounced effects. Thus it is reasonable to conclude that other members of this subcategory would show effects similar to BBP and less pronounced than DINP or DIDP. It should also be noted that the relevance of these findings to human health is, at best, questionable. It has been shown that these effects are mediated through the peroxisome proliferation-activated receptor alpha (PPARα) and that levels of PPARα are much higher in rodents than they are in humans. Thus one would expect humans to be substantially less responsive than rodents to peroxisome proliferating agents. Empirical evidence that this is true is provided by studies in primates in which repeated administration of DINP had no effects on liver, kidney or testicular parameters.

Several of the substances in the transitional phthalate esters subcategory, however, have been shown to produce testicular atrophy when given to juvenile rats at high levels. Testicular atrophy has been associated with BBP and other substances with C₄ to C₆ linear carbon chains. However, molecules with fewer than 4 or more than 6 carbons did not produce testicular atrophy in these studies.

Although the relevance of these data are uncertain, as the testes is not a target organ for diethylhexyl phthalate (DEHP) in primates, these data do provide one of the distinguishing toxicological characteristics of this subcategory and are one of the underlying reasons supporting the differentiation of phthalate esters on the basis of length of the linear region of the carbon chain.

Genetic Toxicity (Salmonella). A number of the substances in this subcategory including the reference substance BBP has been assessed in the Salmonella and mouse lymphoma assays. All of these substances were inactive in these assays.

Chromosomal Aberrations. BBP and dihexyl phthalate (DHP) were inactive in micronucleus assays in mice. DEHP was inactive in a cytogenetics assay in rat bone marrow. Diisoheptyl phthalate was inactive in CHO cells, in vitro..

Reproductive toxicity: A series of studies assessed the structure-activity relationship of the effects of phthalate esters on fertility using a continuous breeding protocol . The test substances included in these studies were diethyl-, dipropyl-, dibutyl-, dipentyl-, d-n-hexyl-, di-2(ethylhexyl)-, and di-n-octyl phthalates. The most profound effects were on fertility (i.e., number of females delivering/ number mated) and number of live births. The substance showing the greatest activity was DEHP which produced effects at dietary levels of 0.1 % with a no effect level of 0.01 %. The next most active compounds were di-n-hexyl- and di-n-pentyl phthalate which showed effects in the range of 0.3 to 0.5 %; no effect levels were not experimentally defined. Dipropyl phthalate had an effect on live birth index at 2.5 % but produced no effects at 1.25 %. Diethyl phthalate and di-n-octyl phthalate were inactive at the highest levels tested, 2.5 % and 5.0 %, respectively. These data demonstrated that molecules with linear alkyl chains of 4 to 6 carbons profoundly affect fertility in rodents, with DEHP being the most active. Molecules with longer or shorter side chains are essentially inactive in these assays. These data were also a basis for the separation of phthalates into three categories based on length of side chain.

In addition to these data there are reproductive toxicity studies on BBP and DEHP .

A 2-generation reproductive study was conducted in rats in which BBP was administered via the diet. Parental effects were limited to changes in body weight, weight gain, and increased absolute and relative liver weights. In the F1 parents, treatment with BBP affected mating and fertility indices and sperm number and motility. The F1 male offspring exhibited shortened anogenital distance, delayed acquisition of puberty and retention of nipples and areolae as well as reproductive effects. The NOAEL of the study was reported to be 3750 mg/ kg for reproductive effects. However, for male F1 and F2 offspring, the NOEL for reproductive effects was reported to be 50 mg/ kg based on reductions in anogenital distance. These studies along with previous data provide a good basis to assess the reproductive effects of C4 to C6 phthalate esters. Although several substances (diheptyl, heptyl nonyl, heptyl undecyl) have ester side chain constituents that predominately fall in the high molecular weight subcategory, these substances are conservatively assumed to exhibit reproductive effects similar to other transitional phthalates .

Developmental toxicity: There have been extensive studies of the developmental toxicity of BBP and DEHP. These substances produce structural malformations and also affect male reproductive development. No effect levels are in the range of 50 to 300 mg/ kg bw/ day. There is also an unpublished developmental toxicity study of di-isoheptyl phthalate (DIHP). The results of these studies are broadly consistent with the structure-activity relationships previously described, i.e., that phthalate esters with linear carbon chains of C4 to C6 carbons produce much more profound effects that either shorter or longer molecules.

Phthalate esters with >10% C4 to C6 isomers were conservatively placed in the transitional subcategory. This conclusion is supported by developmental test data on "711P" (which showed structural malformations in rats at 1000 mg/ kg/ day with a NOAEL of 200 mg/ kg/ day ."711P" is an equal composition mixture of six phthalate esters consisting of linear and methyl-branched C7, C9, and C11 ester side chains. This test substance is considered by EPA under the following CAS Numbers.: 68515-44-6 (di C7), 68515-45-7 (di C9), 3648-20-2 (di C11), 111381-89-6 (C7, C9), 111381-90-9 (C7, C11), and 111381-91-0 (C9, C11). The overall content of C4 to C6 isomers in "711 P" is approximately 10%, based on the contribution from methyl-branched C7 isomers e.g., di C7 (30% C4-C6); C7, C9 (15% C4-C6); and C7, C11 (15 % C4-C6). Test data on 711P were used selectively as read-across data to the C7-containing substances in the mixture, based on the C4 to C6 content of each substance in the mixture.

NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen

[National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

Oral (rat) NOAEL: 28.9-36.1 mg/kg/day

Gastrointestinal changes, respiratory system changes, somnolence, haemorrhage, necrotic changes in GI tract, lowered blood pressure, liver, endocrine tumours, foetotoxicity, paternal effects, maternal effects, specific developmental abnormalities (hepatobiliary system, musculoskeletal system, cardiovascular system, urogenital system, central nervous system, eye/ear), foetolethality recorded.

CARCINOGEN

Di(2-ethylhexyl) phthalate (NB: Overall evaluation downgraded to Group 3 with supporting evidence from other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
Bis(2-ethylhexyl) phthalate (see Di(2-ethylhexyl) phthalate)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	
Di (2-ethylhexyl)phthalate (DEHP)	US EPA Carcinogens Listing	Carcinogenicity	B2
Di (2-ethylhexyl)phthalate (DEHP)	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	B2
Di(2-ethylhexyl)phthalate [DEHP]	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A3
di-sec-octyl phthalate	US - Rhode Island Hazardous Substance List	IARC	

BIS(2-ETHYLHEXYL)PHTHALATE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
BIS(2-ETHYLHEXYL)PHTHALATE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
BROMINE COMPOUNDS (ORGANIC OR INORGANIC)	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
Diethylhexylphthalate	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	2B
Di(2-ethylhexyl)phthalate [DEHP]	US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca
di-sec-octyl phthalate	US - Maine Chemicals of High Concern List	Carcinogen	B2
TWAPPM~	US - Maine Chemicals of High Concern List	Carcinogen	A3
PBIT_(PERS~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IRIS; NTP 11th ROC

SKIN

di-sec-octyl phthalate	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
di-sec-octyl phthalate	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

May cause long-term adverse effects in the environment.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
di-sec-octyl phthalate	LOW	LOW	LOW	LOW

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS TRN A1a A1b A1 A2 B1 B2 C1 C2 C3 D1 D2 D3 E1 E2 E3 Cas No / RTECS No _____
 _____ Di- (2- 642 275 0 4 R 0 0 0 1 1 1 R Fp 3 ethylhexy 1 l) phthalate / CAS:117- 81- 7 /

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/EC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acute mammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation & corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lung injury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When di-sec-octyl phthalate is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U028 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

di-sec-octyl phthalate (CAS: 117-81-7) is found on the following regulatory lists;

"Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada ARET (Accelerated Reduction / Elimination of Toxics) Substance List", "Canada Environmental Protection Act (CEPA) 1999 - Schedule 1 Toxic Substances List", "Canada Environmental Quality Guidelines (EQGs) Water: Aquatic life", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada Priority Substances List (PSL1, PSL 2)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD Representative List of High Production Volume (HPV) Chemicals", "OSPAR List of Chemicals for Priority Action", "OSPAR List of Substances of Possible Concern", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens", "US - California Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity", "US - California Toxic Air Contaminant List Category II", "US - California Toys and Childcare Articles - Phthalate Prohibitions", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Texas Drinking Water Standards - Maximum Contaminant Levels (MCLs) for synthetic organic contaminants", "US - Vermont Hazardous Constituents", "US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Class A toxic air pollutants: Known and Probable Carcinogens", "US - Washington Dangerous waste constituents list", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)", "US CERCLA Priority List of Hazardous Substances", "US Clean Air Act - Hazardous Air Pollutants", "US CWA (Clean Water Act) - Priority Pollutants", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes", "US EPA Carcinogens Listing", "US EPA High Production Volume Program Chemical List", "US EPA Master Testing List - Index I Chemicals Listed", "US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US RCRA (Resource Conservation & Recovery Act) - Appendix IX to Part 264 Ground-Water Monitoring List 1", "US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Inorganic and Organic Constituents 1", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Section 4 - Chemicals Subject to Testing Consent Orders", "US TSCA Section 4/12 (b) - Sunset Date/Status", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health

significance in drinking-water"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Ingestion may produce health damage*.
 - Cumulative effects may result following exposure*.
- * (limited evidence).

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- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: Apr-21-2011

Print Date: Jun-4-2011

SAFETY DATA SHEET

Version 5.1
Revision Date 06/27/2014
Print Date 04/20/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Endosulfan sulfate

Product Number : 36676

Brand : Sigma

CAS-No. : 1031-07-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 2), H300
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H300

Fatal if swallowed.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P273

Avoid release to the environment.

P301 + P310

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P321

Specific treatment (see supplemental first aid instructions on this label).

P330

Rinse mouth.

P391

Collect spillage.

P405

Store locked up.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none**3. COMPOSITION/INFORMATION ON INGREDIENTS****3.1 Substances**

Formula : $\text{C}_9\text{H}_6\text{Cl}_6\text{O}_4\text{S}$
Molecular Weight : 422.92 g/mol
CAS-No. : 1031-07-8

Hazardous components

Component	Classification	Concentration
Endosulfan sulfate		
	Acute Tox. 2; Aquatic Acute 1; Aquatic Chronic 1; H300, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES**4.1 Description of first aid measures****General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Sulphur oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|-------------------------------------|
| a) Appearance | Form: solid |
| b) Odour | no data available |
| c) Odour Threshold | no data available |
| d) pH | no data available |
| e) Melting point/freezing point | 179.0 - 182.0 °C (354.2 - 359.6 °F) |
| f) Initial boiling point and boiling range | no data available |
| g) Flash point | no data available |
| h) Evaporation rate | no data available |
| i) Flammability (solid, gas) | no data available |
| j) Upper/lower flammability or explosive limits | no data available |
| k) Vapour pressure | no data available |
| l) Vapour density | no data available |
| m) Relative density | no data available |
| n) Water solubility | insoluble |
| o) Partition coefficient: n-octanol/water | log Pow: 3.66 |
| p) Auto-ignition temperature | no data available |
| q) Decomposition temperature | no data available |
| r) Viscosity | no data available |
| s) Explosive properties | no data available |
| t) Oxidizing properties | no data available |

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - rat - 18.0 mg/kg

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: RB9150000

Cholinesterase inhibitors can cause heavy salivation and secretion in the lungs, lachrymation, blurred vision, involuntary defecation, diarrhea, tremor, ataxia, sweating, hypothermia, lowered heart rate, and/or a fall in blood pressure as a result of their action at cholinergic nerve sites., Headache, Nausea, Vomiting, Dizziness, Drowsiness, Confusion., Weakness, Muscle cramps/spasms., Change in pupil size., Fever, Seizures., Incoordination., Convulsions, Coma.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Carassius auratus (goldfish) - > 0.01 - < 0.1 mg/l - 48.0 h
	LC50 - Leuciscus idus (Golden orfe) - > 0.01 - < 0.1 mg/l - 48.0 h
	LC50 - other fish - > 0.001 - < 0.01 mg/l - 48.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.76 mg/l - 48 h
	LC50 - Daphnia magna (Water flea) - > 0.1 - < 1 mg/l - 48 h

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811	Class: 6.1	Packing group: II
Proper shipping name: Toxic solids, organic, n.o.s. (Endosulfan sulfate)		
Reportable Quantity (RQ): 1 lbs		
Marine pollutant: No		
Poison Inhalation Hazard: No		

IMDG

UN number: 2811	Class: 6.1	Packing group: II	EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Endosulfan sulfate)			
Marine pollutant: No			

IATA

UN number: 2811	Class: 6.1	Packing group: II
Proper shipping name: Toxic solid, organic, n.o.s. (Endosulfan sulfate)		

15. REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Endosulfan sulfate	1031-07-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Endosulfan sulfate	1031-07-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Endosulfan sulfate	1031-07-8	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H300	Fatal if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1

Revision Date: 06/27/2014

Print Date: 04/20/2016

SAFETY DATA SHEET

Version 4.10

Revision Date 07/09/2015

Print Date 02/23/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Ethyl Alcohol, pure

Product Number : 459836
Brand : Sigma-Aldrich
Index-No. : 603-002-00-5

CAS-No. : 64-17-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USATelephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H225 : Highly flammable liquid and vapour.
H319 : Causes serious eye irritation.

Precautionary statement(s)

P210 : Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 : Keep container tightly closed.
P240 : Ground/bond container and receiving equipment.
P241 : Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 : Use only non-sparking tools.
P243 : Take precautionary measures against static discharge.
P264 : Wash skin thoroughly after handling.
P280 : Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353 : IF ON SKIN (or hair): Take off immediately all contaminated clothing.

P305 + P351 + P338	Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Absolute alcohol

Formula : C₂H₆O

Molecular weight : 46.07 g/mol

CAS-No. : 64-17-5

EC-No. : 200-578-6

Index-No. : 603-002-00-5

Hazardous components

Component	Classification	Concentration
Ethanol		
	Flam. Liq. 2; Eye Irrit. 2A; H225, H319	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Hygroscopic.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Ethanol	64-17-5	TWA	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans		
		TWA	1,000 ppm 1,900 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1,000 ppm 1,900 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	1,000.000000 ppm 1,900.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

		TWA	1,000.000000 ppm 1,900.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		STEL	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm

Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 38 min

Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---------------|---|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |

c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: -114 °C (-173 °F)
f) Initial boiling point and boiling range	78 °C (172 °F)
g) Flash point	14.0 °C (57.2 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 19 %(V) Lower explosion limit: 3.3 %(V)
k) Vapour pressure	59.5 hPa (44.6 mmHg) at 20.0 °C (68.0 °F)
l) Vapour density	No data available
m) Relative density	0.789 g/mL at 25 °C (77 °F)
n) Water solubility	completely soluble
o) Partition coefficient: n-octanol/water	log Pow: -0.349 at 24 °C (75 °F)
p) Auto-ignition temperature	363.0 °C (685.4 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Alkali metals, Oxidizing agents, Peroxides

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 10,470 mg/kg

LC50 Inhalation - Rat - 4 h - 30,000 mg/l

LD50 Dermal - Rabbit - 15,800 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 24 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Moderate eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Carcinogenicity - Mouse - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Liver: Tumors. Blood: Lymphomas including Hodgkin's disease.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

Reproductive toxicity - Human - female - Oral

Effects on Newborn: Apgar score (human only). Effects on Newborn: Other neonatal measures or effects. Effects on Newborn: Drug dependence.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: KQ6300000

Central nervous system depression, narcosis, Damage to the heart., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 14,200 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates LC50 - Ceriodaphnia dubia (water flea) - 5,012 mg/l - 48 h

NOEC - Daphnia magna (Water flea) - 9.6 mg/l - 9 d

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 275 mg/l - 72 h
(OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability Result: 95 % - Readily biodegradable

12.3 Bioaccumulative potential

Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1170 Class: 3 Packing group: II
Proper shipping name: Ethanol
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

UN number: 1170 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ETHANOL

IATA

UN number: 1170 Class: 3 Packing group: II
Proper shipping name: Ethanol

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Ethanol

CAS-No.
64-17-5

Revision Date
2007-03-01

Pennsylvania Right To Know Components

CAS-No.

Revision Date

Ethanol

64-17-5

2007-03-01

New Jersey Right To Know Components

Ethanol

CAS-No.
64-17-5

Revision Date
2007-03-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10

Revision Date: 07/09/2015

Print Date: 02/23/2016



Safety Data Sheet - Version 5.0

Preparation Date 9/15/2015

Latest Revision Date (If Revised)

SDS Expiry Date 9/13/2018

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Chemical Name γ -Chlordane

Catalogue # C327040

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Product Uses To be used only for scientific research and development. Not for use in humans or animals.

1.3 Details of the Supplier of the Safety Data Sheet

Company Toronto Research Chemicals
2 Brisbane Road
Toronto, ON M3J 2J8
CANADA

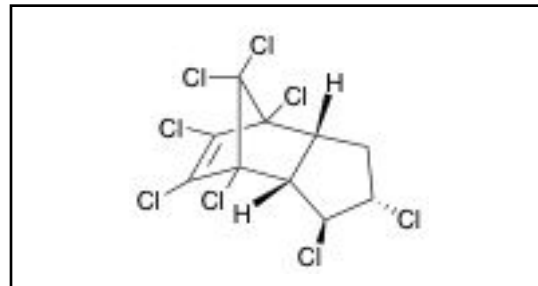
Telephone +14166659696

FAX +14166654439

Email orders@trc-canada.com

1.4 Emergency Telephone Number

Emergency# +14166659696 between 0800-1700 (GMT-5)



2. HAZARDS IDENTIFICATION

WHMIS Classification (Canada)

D2A Very Toxic Material Causing Other Toxic Effects
Carcinogen

WHMIS Symbols (Canada)



2.1/2.2 Classification of the Substance or Mixture and Label Elements

GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

Acute Toxicity, Oral (Category 4)

Carcinogenicity (Category 2)

Hazardous to the Aquatic Environment, Acute Hazard (Category 1)

EU Classification (According to EU Regulation 67/548/EEC)

Harmful if swallowed. May cause cancer. Very toxic to aquatic organisms.

EU Risk and Safety Statements (According to EU Regulation 67/548/EEC)

Hazard Statements	Hazard Codes
-------------------	--------------

Harmful	Xn
---------	----

Environmental Hazard	N
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Risk Codes and Phrases

R22 Harmful if swallowed.

R45 May cause cancer.

R50 Very toxic to aquatic organisms.

Safety Precaution Codes and Phrases

S61 Avoid release to the environment. Refer to special instructions.

GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

Signal Word Warning



GHS Hazard Statements

H302 Harmful if swallowed.
H351 Suspected of causing cancer.
H400 Very toxic to aquatic life.

GHS Precautionary Statements

P273 Avoid release to the environment.
P281 Use personal protective equipment as required.

2.3 Unclassified Hazards/Hazards Not Otherwise Classified

No data available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular Formula: C₁₀H₆Cl₈

Molecular Weight: 409.78

CAS Registry #: 5103-74-2

EC#: 225-826-0

Synonyms

(1R,2R,3aS,4S,7R,7aS)-rel-1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-,4,7-methano-1H-indene;
(1α,2β,3αα,4β,7β,7αα)-1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene;
1β,2α,4α,5,6,7α,8,8-Octachloro-3aβ,4,7,7aβ-tetrahydro-4,7-methanoindan; (±)-trans-Chlordane; trans-Chlordan; trans-1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-endo-methanoindan; trans-Chlordan; trans-Chlordane; β-Chlordan; β-Chlordane;

3.2 Mixtures

Not a mixture.

4. FIRST AID MEASURES

4.1 Description of First Aid Measures

General Advice

If medical attention is required, show this safety data sheet to the doctor.

If Inhaled

If inhaled, move person to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact

Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

In Case of Eye Contact

Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

If Swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or in section 11.

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed

No data available.

5. FIREFIGHTING MEASURES

5.1 Extinguishing Media

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.2 Special Hazards Arising from the Substance or Mixture

Carbon oxides, Hydrogen chloride

5.3 Advice for Firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further Information

No data available.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Method and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage conditions: No Data Available

7.3 Specific End Uses

For scientific research and development only. Not for use in humans or animals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control Parameters**

Contains no components with established occupational exposure limits.

8.2 Exposure Controls**Appropriate Engineering Controls**

A laboratory fumehood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

Personal Protective Equipment

All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

Eye/Face Protection

Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

Skin Protection

Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as "chemical resistant" by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not recommended.

Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated "chemical resistant" as per EN 734 with the resistance codes corresponding to the anticipated use of the material.

Suggested gloves: AnsellPro Viton/Butyl gloves style 38-612, 4/8 mil thickness.
Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

Body Protection

Fire resistant (Nomex) coveralls or chemical-resistant bodysuit (laminated Tychem SL or equivalent).

Respiratory Protection

Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

A) Appearance

No Data Available

C) Odour Threshold

No data available.

E) Melting Point/Freezing Point

No Data Available

G) Flash point

No data available.

I) Flammability (Solid/Gas)

No data available.

K) Vapour Pressure

No data available.

M) Relative Density

1.590 g/cm³

O) Partition Coefficient: n-octanol/water

No data available.

Q) Decomposition Temperature

No data available.

S) Explosive Properties

No data available.

B) Odour

odourless

D) pH

No data available.

F) Initial Boiling Point/Boiling Range

No data available.

H) Evaporation Rate

No data available.

J) Upper/Lower Flammability/Explosive Limits

No data available.

L) Vapour Density

No data available.

N) Solubility

No Data Available

P) Auto-Ignition Temperature

No data available.

R) Viscosity

No data available.

T) Oxidizing Properties

No data available.

9.2 Other Information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available.

10.2 Chemical Stability

Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions

No data available.

10.4 Conditions to Avoid

No data available.

10.5 Incompatible Materials

Strong oxidizing agents.

10.6 Hazardous Decomposition Products

Other decomposition products: No data available. In the event of fire: see section 5.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

A) Acute Toxicity

Oral LD50: Mouse - 275 mg/kg

Rat - 1,100 mg/kg

Inhalation LC50: No data available.

Dermal LD50: No data available.

B) Skin Corrosion/Irritation

No data available

C) Serious Eye Damage/Irritation

No data available

D) Respiratory or Skin Sensitization

No data available

E) Germ Cell Mutagenicity

No data available

F) Carcinogenicity

Evidence of a carcinogenic effect.

This compound has been designated by the IARC as Group 2B: Possibly carcinogenic to humans.

G) Reproductive Toxicity/Teratogenicity

No data available

H) Single Target Organ Toxicity - Single Exposure

No data available

I) Single Target Organ Toxicity - Repeated Exposure

No data available

J) Aspiration Hazard

No data available

K) Potential Health Effects and Routes of Exposure

Inhalation

May be harmful if inhaled. May cause respiratory tract irritation.

Ingestion

Harmful if swallowed.

Skin

Harmful if absorbed through skin. May cause skin irritation.

Eyes

May cause eye irritation.

L) Signs and Symptoms of Exposure

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or in section 11.

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

M) Additional Information

RTECS: PC0365000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish:

LC50 - *Lepomis macrochirus* - 0.05 mg/l - 96 h

12.2 Persistence and Degradability

No data available.

12.3 Bioaccumulative Potential

No data available.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

No data available.

12.6 Other Adverse Effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

A) Product

Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

B) Contaminated Packaging

Dispose of as above.

C) Other Considerations

Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

14. TRANSPORT INFORMATION

14.1 UN Number

DOT (US): UN3077 IATA: UN3077 IMDG: UN3077 ADR/RID: UN3077

14.2 UN Proper Shipping Name

DOT (US)/IATA:

Environmentally hazardous substances, solid, n.o.s. (trans-Chlordane)

IMDG/ARD/RID:

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (trans-Chlordane)

14.3 Transport Hazard Class(es)

DOT (US): 9 IATA: 9 IMDG: 9 ADR/RID: 9

14.4 Packing Group

DOT (US): III IATA: III IMDG: III ADR/RID: III

14.5 Environmental Hazards

DOT (US): None IATA: None IMDG: Marine pollutant ADR/RID: None

14.6 Special Precautions for User

None

15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

A) Canada

DSL/NDSL Status: This product is not listed on the Canadian DSL/NDSL.

B) United States

TSCA Status: This product is not listed on the US EPA TSCA.

C) European Union

ECHA Status: This product is not registered with the EU ECHA.

15.2 Chemical Safety Assessment

No data available

16. OTHER INFORMATION

16.1 Revision History

Original Publication Date: 9/15/2015

16.2 List of Abbreviations

LD50	Median lethal dose of a substance required to kill 50% of a test population.
LC50	Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo	Lowest known lethal dose
TDLo	Lowest known toxic dose
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
RTECS	Registry of Toxic Effects of Chemical Substances

16.3 Further Information

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believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.

SAFETY DATA SHEET

Version 5.7
Revision Date 11/03/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Heptane

Product Number : 246654
Brand : Sigma-Aldrich
Index-No. : 601-008-00-2

CAS-No. : 142-82-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₇ H ₁₆
Molecular weight	: 100.20 g/mol
CAS-No.	: 142-82-5
EC-No.	: 205-563-8
Index-No.	: 601-008-00-2
Registration number	: 01-2119457603-38-XXXX

Hazardous components

Component	Classification	Concentration
Heptane		
	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 1; Aquatic Chronic 1; H225, H304, H315, H336, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

Flash back possible over considerable distance.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store under inert gas. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Heptane	142-82-5	TWA	85.000000 ppm 350.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	440.000000 ppm 1,800.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	15 minute ceiling value		
		TWA	500.000000 ppm 2,000.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		STEL	500.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		TWA	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		STEL	500.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		TWA	400 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		STEL	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 65 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: liquid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -91 °C (-132 °F) |
| f) Initial boiling point and boiling range | 98 °C (208 °F) |
| g) Flash point | -3.99 °C (24.82 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | Upper explosion limit: 7 %(V)
Lower explosion limit: 1.1 %(V) |
| k) Vapour pressure | 110.7 hPa (83.0 mmHg) at 37.7 °C (99.9 °F)
53.3 hPa (40.0 mmHg) at 20.0 °C (68.0 °F) |
| l) Vapour density | No data available |

m) Relative density	0.684 g/mL at 25 °C (77 °F)
n) Water solubility	insoluble
o) Partition coefficient: n-octanol/water	log Pow: > 3.000
p) Auto-ignition temperature	223.0 °C (433.4 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

LC50 Inhalation - Rat - 4 h - 103,000 mg/m³

Inhalation: Irritating to respiratory system.

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No data available

May cause drowsiness or dizziness.

No data available

May be fatal if swallowed and enters airways.

RTECS: MI77000000

Prolonged or repeated exposure to skin causes defatting and dermatitis., Central nervous system depression, narcosis, Damage to the lungs.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12.1 Toxicity

Toxicity to fish LC50 - *Carassius auratus* (goldfish) - 4 mg/l - 24.0 h

LC50 - *Tilapia mossambica* - 375 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 1.50 mg/l - 48 h

Ratio BOD/ThBOD	3.5 %
-----------------	-------

Indication of bioaccumulation.

No data available

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

Do not empty into drains. Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1206 Class: 3 Packing group: II
Proper shipping name: Heptanes
Reportable Quantity (RQ):
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 1206 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: HEPTANES
Marine pollutant:yes

IATA

UN number: 1206 Class: 3 Packing group: II
Proper shipping name: Heptanes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.7

Revision Date: 11/03/2015

Print Date: 02/18/2016

MATERIAL SAFETY DATA SHEET

ERA A Waters Company

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION


MANUFACTURER: ERA (Environmental Resource Associates) **BUSINESS PHONE:** 303-431-8454
ADDRESS: 6000 W. 54th Avenue **FAX:** 303-421-0159 **EMAIL:** info@eraqc.com
Arvada, CO, 80002 U.S.A. **CHEMICAL EMERGENCY PHONE:** 352-535-5053 (INFOTRAC)

Product Name(s): Hexavalent Chromium 1000 mg/L
Catalog / Part Number(s): 019, 973, 186004178
MSDS Creation Date: November 22, 2005
Revision Date: September 29, 2009 **MSDS Reference Number:** 019

SECTION 2: HAZARDS IDENTIFICATION

Toxic. Harmful by inhalation. May cause cancer. Risk of cancer depends on duration and level of exposure. The matrix of each standard is a K2Cr2O7/water mixture listed below which is classified as dangerous by Directive 199/45/EC. Use only as directed and in accordance with good laboratory practices.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL INGREDIENT NAME	CAS NUMBER	EC NUMBER	% BY WT.	EXPOSURE LIMITS		EU LABEL
				OSHA	ACGIH	HAZARD LABEL
Potassium dichromate	7778-50-9	231-906-6	≤0.1	0.1 mg/m3 PEL	0.05 mg/m3	

Notes: This standard is 125 mL of a mixture containing potassium dichromate salt with the balance being ≥99.9% water. Hexavalent chromium is a known human carcinogen. Exposure Limits are 8-Hour TWA (Time Weighted Average) unless designated C (Ceiling) or STEL (Short Term Exposure Limit). Other components considered Non-Hazardous under OSHA 1910.1200 (HazCom) as they are not present in concentrations exceeding 1% (or 0.1% if considered a known or potential carcinogen). Material Use: Analytical reagent or certified reference material used in laboratories. Uses also include research and development.

SECTION 4: FIRST-AID MEASURES

Inhalation: Remove to fresh air.
Skin Contact: Flush with water.
Eye Contact: Immediately flush with water for a minimum of 15 minutes.
Ingestion: Get medical attention
After following first aid measures, seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Flammable Properties: Not flammable.
Extinguishing Media: Dry chemical, carbon dioxide or appropriate foam.
Unique Aspects Contributing To a Fire: None.
Special Fire Fighting Procedures: None.
Note: As in any fire, wear self-contained breathing apparatus, and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Absorb liquid with spill pillow or other absorbent. Ventilate and wash spill site after material pick up is complete. Place wastes into closed containers for proper disposal.

SECTION 7: HANDLING AND STORAGE

Handle in accordance with good laboratory practices. Store in a dry well-ventilated place. This product is intended for use only by people trained in the safety and handling of chemicals and laboratory preparations.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Handle in accordance with good laboratory practices. Wash thoroughly after handling.
Respiratory Protection: Not normally needed. If exposure limits are exceeded, use approved respirator.
Eye Protection: Safety glasses with side shields or safety goggles
Skin Protection: Neoprene or other chemical resistant gloves.
Engineering Controls: Not normally needed. If exposure limits are exceeded, work in a fume hood.

MATERIAL SAFETY DATA SHEET

ERA A Waters Company

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

DATA FOR MATRIX:

Appearance:	Clear to yellow	Specific Gravity:	NA	Melting Point:	NA
Physical State:	Liquid	Flash Point:	NA	Vapor Pressure:	NA
Odor:	NA	Explosion Limits:	NA	Vapor Density (air=1):	NA
pH:	NA	Boiling Point:	NA	Solubility in Water:	Soluble

SECTION 10: STABILITY AND REACTIVITY

Hazardous Polymerization Will Not Occur ☒ May Occur ☐ Stability: Stable ☒ Unstable ☐
Hazardous Decomposition/Combustion Products: NA
Conditions and Materials to Avoid: Oxidizing agents.

SECTION 11: TOXICOLOGICAL INFORMATION

Primary Route(s) of Exposure Under Normal Use: Skin contact: may cause skin irritation or be harmful if absorbed through skin. Eye contact: may cause eye irritation. Inhalation: harmful if inhaled, may be irritation to mucous membranes and upper respiratory tract. Ingestion: harmful if swallowed.

Target Organ(s): Lungs, kidneys, blood.

Acute Effects: Harmful by inhalation. May cause sensitization by inhalation and skin contact. Ingestion can cause vomiting.
Potassium dichromate: Oral, child: LDLO=26 mg/kg; Oral, man: LDLO=143 mg/kg; Oral, rat: LD50=25 mg/kg; Skin, rabbit: LD50=14 mg/kg.

Chronic Effects: Carcinogen; Teratogen; May cause heritable genetic damage. Reproductive hazard; May impair fertility. May cause harm to the unborn child.

Other Information: Chemical Ingredient(s) potassium dichromate is classified as carcinogen(s) by OSHA, IARC (Group 1), NTP, ACGIH (A1), or California. California Prop-65: This product is or contains chemicals known to the state of California to cause cancer.

SECTION 12: ECOLOGICAL INFORMATION

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Avoid release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

To determine proper disposal, consult applicable federal, state and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION

Shipment Name/Type: Non-hazardous for transport.
UN Number: NA Shipping/Hazardous Class: NA Packing Group: NA
Shipping regulations are based on combinations of criteria such as quantity, class and packaging according to DOT, IATA and (49) CFR.

SECTION 15: REGULATORY INFORMATION

EU Symbol of Danger: Toxic (T) concentration ≤ 0.1 C $< 0.2\%$
EU Risk Phrases: May cause cancer [R45]; May cause heritable genetic damage [R46]; Harmful by inhalation [R20].

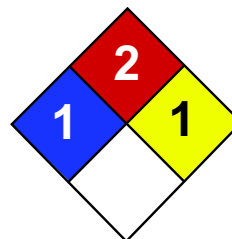
U.S. TSCA: Listed
Canada: This product has been classified according to the hazard criteria of the CPR and this MSDS contains all the information required by the CPR.

SECTION 16: OTHER INFORMATION

United States EPA Regulatory Information:	NFPA Rating:	Health: 3	Flammability: 0	Reactivity: 0
SARA 313: Yes (0.1% deminimis)	HMIS Rating:	Health: 3	Flammability: 0	Physical Hazard: 0
CERCLA RQ: 10 lbs				

NOTE: NA = Data not available, not established, determined or not pertinent.

DISCLAIMER: The information contained herein has been compiled from data presented in various technical sources believed to be accurate. This information is intended to be used only as a guide and does not purport to be complete. ERA makes no warranties and assumes no liability in connection with the use of this information. It is the user's responsibility to determine the suitability of this information and to assure the adoption of necessary precautions.



Health	1
Fire	2
Reactivity	1
Personal Protection	E

Material Safety Data Sheet

Iron Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Iron Metal

Catalog Codes: SLI2047, SLI1996

CAS#: 7439-89-6

RTECS: NO4565500

TSCA: TSCA 8(b) inventory: Iron Metal

CI#: Not applicable.

Synonym:

Chemical Name: Iron

Chemical Formula: Fe

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Iron Metal, powder	7439-89-6	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to liver, cardiovascular system, upper respiratory tract, pancreas. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Chlorine Trifluoride reacts with iron with incandescence. Powdered iron reacts with fluorine below redness with incandescence. Reduced iron decomposes with nitrogen dioxide @ ordinary temperature with incandescence. Reacting mass formed by mixture of phosphorus and iron can become incandescent when heated. This material is flammable in powder form only.

Special Remarks on Explosion Hazards: Material in powdered form can explode when exposed to heat or flame

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Moisture sensitive.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Tasteless.

Molecular Weight: 55.85 g/mole

Color: Black to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 3000°C (5432°F)

Melting Point: 1535°C (2795°F)

Critical Temperature: Not available.

Specific Gravity: Density: 7.86 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, incompatible materials, water/moisture, air, dust generation.

Incompatibility with various substances:

Reactive with oxidizing agents, acids. Slightly reactive to reactive with moisture.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:

Hot iron(wire) burns in Chlorine gas. Violent decomposition of hydrogen peroxide (53% by weight or greater) may be caused by contact with iron. Readily oxidizes in moist air forming rust. Reactive with halogens. Incompatible with acetaldehyde, ammonium peroxodisulfate, chloroformamidine, chloric acid, ammonium nitrate, dinitrogen tetroxide, nitryl fluoride, polystyrene, sodium acetylide, potassium dichromate, peroxyformic acid, sulfuric acid, sodium carbide. Readily attacked by dilute mineral acids and or attacked or dissolved by organic acids. Not appreciably attacked by cold sulfuric acid, or nitric acid, but is attacked by hot acids.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 30000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: liver, cardiovascular system, upper respiratory tract, pancreas.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Iron metal filings or dust: May cause skin irritation by mechanical action. Iron metal wire: Not likely to cause skin irritation. Eyes: Iron metal filings or dust: Can irritate eyes by mechanical action. Iron metal wire: No hazard. Will not cause eye irritation. Inhalation: Iron dust: Can irritate the respiratory tract by mechanical action. Iron metal wire or filings: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Iron metal wire: Not an ingestion hazard. Iron metal filings or dust: The amount of ingested iron which constitutes a toxic dose is not well defined. Proposed toxic doses of elemental iron are 20 mg/kg for gastrointestinal irritation to greater than 60 mg/kg for systemic toxicity. Gastrointestinal effects are the first signs to appear, with hemorrhagic vomiting and diarrhea, hematochezia, abdominal pain, lethargy, metabolic acidosis, coagulopathy, shock, coma and convulsions developing from 0 to 6 hours after ingestion. Leukocytosis may also occur. An asymptomatic phase may ensue at 6 to 12 hours post-ingestion, followed by hypoglycemia or hyperglycemia, hepatic and renal failure, severe acidosis, cyanosis, fever, CNS depression (lethargy, restlessness and/or confusion seizures), hypotension, and cardiovascular collapse/cardiac failure in 12 to 48 hours. Hepatic cirrhosis, gastrointestinal scarring and/or strictures may arise in 2 to 6 weeks. It may also cause an anaphylactoid reaction. Non-cardiogenic pulmonary edema also develop in severe cases of iron intoxication. Chronic Potential Health Effects: Inhalation: Chronic inhalation of iron dust can lead to accumulation in the lungs and a characteristic stippled appearance on X-rays. This condition, called SIDEROSIS, is considered benign in that it does not interfere with lung function and does not predispose to other disease. Chronic inhalation of iron dust may also cause fibrosis in the lungs. Ingestion: Clinical signs of iron overload appear when the total body iron is 5 to 10 times higher than normal. Neurobehavioral defects including depression, decreased activity, habituation, reflex startle, and conditioned avoidance response performance may occur. However, similar effects were also seen in iron deficiency. It is therefore likely that these behavioral effects are secondary to general toxicity. High serum iron levels may be associated with an increased risk of fatal acute myocardial infarction (MI). Skin: Prolonged or repeated contact may cause hypersensitivity.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Metal powder, flammable, n.o.s. (Iron metal powder) UNNA: 3089 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California Director's List of Hazardous Substances: Iron Metal TSCA 8(b) inventory: Iron Metal

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS B-4: Flammable solid.

DSCL (EEC):

R11- Highly flammable. S16- Keep away from sources of ignition - No smoking. S22- Do not breathe dust.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 2

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 2

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:52 PM

Last Updated: 11/06/2008 12:00 PM

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SAFETY DATA SHEET

Version 5.8
Revision Date 03/06/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Isopropyl alcohol

Product Number : W292907
Brand : Aldrich
Index-No. : 603-117-00-0

CAS-No. : 67-63-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225

Eye irritation (Category 2A), H319

Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225

Highly flammable liquid and vapour.

H319

Causes serious eye irritation.

H336

May cause drowsiness or dizziness.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242

Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 2-Propanol
sec-Propyl alcohol
Isopropyl alcohol
Isopropanol

Formula : C₃H₈O
Molecular weight : 60.10 g/mol
CAS-No. : 67-63-0
EC-No. : 200-661-7
Index-No. : 603-117-00-0

Hazardous components

Component	Classification	Concentration
2-Propanol		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas. hygroscopic

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
2-Propanol	67-63-0	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment		

		Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	400 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	400.000000 ppm 980.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	400.000000 ppm 980.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	500.000000 ppm 1,225.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
2-Propanol	67-63-0	Acetone	40.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 60 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|---|
| a) Appearance | Form: liquid
Colour: colourless |
| b) Odour | alcohol-like |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -89.5 °C (-129.1 °F) - lit. |
| f) Initial boiling point and boiling range | 82 °C (180 °F) - lit. |
| g) Flash point | 12.0 °C (53.6 °F) - closed cup |
| h) Evaporation rate | 3.0 |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or | Upper explosion limit: 12.7 %(V)
Lower explosion limit: 2 %(V) |

explosive limits

- | | |
|---|--|
| k) Vapour pressure | 43.2 hPa (32.4 mmHg) at 20.0 °C (68.0 °F)
58.7 hPa (44.0 mmHg) at 25.0 °C (77.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 0.785 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | completely soluble |
| o) Partition coefficient: n-octanol/water | log Pow: 0.05 |
| p) Auto-ignition temperature | 425.0 °C (797.0 °F) |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

Surface tension	20.8 mN/m at 25.0 °C (77.0 °F)
-----------------	--------------------------------

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year. Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials

Oxidizing agents, Acid anhydrides, Aluminium, Halogenated compounds, Acids

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 5,045 mg/kg

Remarks: Behavioral: Altered sleep time (including change in righting reflex). Behavioral: Somnolence (general depressed activity).

LC50 Inhalation - Rat - 8 h - 16000 ppm

LD50 Dermal - Rabbit - 12,800 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation - 24 h

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2-Propanol)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

Inhalation, Oral - May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: NT8050000

Central nervous system depression, prolonged or repeated exposure can cause:, Nausea, Headache, Vomiting, narcosis, Drowsiness, Overexposure may cause mild, reversible liver effects., Aspiration may lead to:, Lung oedema, Pneumonia

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney - Irregularities - Based on Human Evidence

Kidney - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 9,640.00 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 5,102.00 mg/l - 24 h

Immobilization EC50 - Daphnia magna (Water flea) - 6,851 mg/l - 24 h

Toxicity to algae EC50 - Desmodesmus subspicatus (green algae) - > 2,000.00 mg/l - 72 h

EC50 - Algae - > 1,000.00 mg/l - 24 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No bioaccumulation is to be expected (log Pow <= 4).

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Isopropanol
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

UN number: 1219 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ISOPROPANOL

IATA

UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Isopropanol

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8

Revision Date: 03/06/2015

Print Date: 02/18/2016

MATERIAL SAFETY DATA SHEET

Date Printed: 02.04.2016

Date Updated: 07.08.2012

Version 1.9

Section 1 - Product and Company Information

Product Name	M-CRESOL APPROX 99%
Product Number	C5015
Brand	SIGMA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
M-CRESOL	108-39-4	Yes
Formula	C7H8O	
Synonyms	3-Cresol * m-Cresol (ACGIH:OSHA) * m-Cresole * m-Cresylic acid * 1-Hydroxy-3-methylbenzene * m-Hydroxytoluene * 3-Hydroxytoluene * m-Kresol * m-Methylphenol * 3-Methylphenol * m-Oxytoluene * Phenol, 3-methyl- (9CI) * RCRA waste number U052 * m-Toluol	
RTECS Number:	GO6125000	

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic.

Toxic in contact with skin and if swallowed. Causes burns.

Readily absorbed through skin. Combustible. Target organ(s):

Central nervous system. Lungs.

HMIS RATING

HEALTH: 3*

FLAMMABILITY: 2

REACTIVITY: 1

NFPA RATING

HEALTH: 3

FLAMMABILITY: 2

REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately. Do not induce vomiting.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT

186,800 °F 86,000 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1,060 % Upper: 1,350 %

AUTOIGNITION TEMP

558,00 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry lime or soda ash, pick up, keep in a closed container, and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on

skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed. Keep away from heat and open flame. Store in a cool dry place.

Unsuitable: May discolor on exposure to air and light.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

Other: Faceshield (8-inch minimum).

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	5 PPM
Remarks: Skin			
USA	MSHA Standard-air	TWA	5 PPM (22 MG/M3)
USA	OSHA.	PEL	8H TWA 5 PPM (22 MG/M3) (SKIN)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	2.3 PPM

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Liquid	
Property	Value	At Temperature or Pressure
Molecular Weight	108,1400 AMU	
pH	N/A	
BP/BP Range	200,000. - 203,000 °C.	
MP/MP Range	8,000. - 10,000 °C.	
Freezing Point	N/A	
Vapor Pressure	< 1,000000000 mmHg	20,00 °C
Vapor Density	3,720 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1,0340 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	

Evaporation Rate	N/A	
Viscosity	12,900 Pas	25,000 °C
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	186,800 °F	Method: closed cup
	86,000 °C	
Explosion Limits	Lower: 1,060 %	
	Upper: 1,350 %	
Flammability	N/A	
Autoignition Temp	558,00 °C	
Refractive Index	1,5420	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Other Solvents: SOLUBLE IN ACETONE, ETHANOL, MISCIBLE IN ALCOHOL, ETHER	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Oxidizing agents, Bases.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes burns.

Skin Absorption: Toxic if absorbed through skin. Readily absorbed through skin.

Eye Contact: Causes burns.

Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

Ingestion: Toxic if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Central nervous system. Eyes. Liver. Kidneys. Lungs.

SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause: Damage to the eyes. Damage to the kidneys. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
242,000000 mg/kg
LD50
Remarks: Behavioral:Somnolence (general depressed activity).
Behavioral:Convulsions or effect on seizure threshold.
Gastrointestinal:Peritonitis.

Inhalation
Rat
> 710,000 mg/m3
LC50

Skin
Rat
1100,000000 mg/kg
LD50

Oral
Mouse
828,000000 mg/kg
LD50

Intraperitoneal
Mouse
168 MG/KG
LD50

Skin
Rabbit
2050,000000 mg/kg
LD50
Remarks: Behavioral:Convulsions or effect on seizure threshold.
Sense Organs and Special Senses (Nose, Eye, Ear, and
Taste):Eye:Lacrimation. Gastrointestinal:Changes in structure or
function of salivary glands.

IRRITATION DATA

Skin
Rabbit
517,000000 mg
24H
Remarks: Severe irritation effect

Eyes
Rabbit
103,000000 mg
Remarks: Severe irritation effect

CHRONIC EXPOSURE - CARCINOGEN

Species: Mouse
Route of Application: Skin
Dose: 2280 MG/KG
Exposure Time: 20W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and
Appendages: Other: Tumors.

CHRONIC EXPOSURE - TERATOGEN

Species: Rabbit
Dose: 134 GM/KG
Route of Application: Subcutaneous
Exposure Time: (6-18D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 10 UMOL/L
Exposure Time: 4H
Cell Type: HeLa cell
Mutation test: DNA inhibition

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Algae
Time: 24,0 h
Value: 110,000 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24,0 h
Value: 25,000 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48,0 h
Value: 17,000. - 19,000 mg/l.

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96,0 h
Value: 8,900 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Cresols
UN#: 2076
Class: 6.1
Packing Group: Packing Group II
Hazard Label: Toxic substances.
Hazard Label: Corrosive
PIH: Not PIH

IATA

Proper Shipping Name: Cresols, liquid (o-, m-, p-)

IATA UN Number: 2076
Hazard Class: 6.1
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: T
Indication of Danger: Toxic.
R: 24/25-34
Risk Statements: Toxic in contact with skin and if swallowed.
Causes burns.
S: 36/37/39-45
Safety Statements: Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Toxic.
Risk Statements: Toxic in contact with skin and if swallowed.
Causes burns.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
US Statements: Readily absorbed through skin. Combustible.
Target organ(s): Central nervous system. Lungs.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes
DEMINIMIS: 1,000 %
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
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MATHESON

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Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Section 1 - IDENTIFICATION

Product Identifier: METHYL CHLOROFORM

Trade Names/Synonyms

MTG MSDS 219; 1,1,1-TRICHLOROETHANE; ALPHA-TRICHLOROETHANE; AEROTHENE TT;
METHYLTRICHLOROMETHANE; METHYLCHLOROFORM; TRICHLOROMETHYLMETHANE;
TRICHLOROETHANE; ETHANE, 1,1,1-TRICHLOROETHANE; CHLORTEN; 1,1,1-TRICHLORETHANE; UN
2831; C2H3Cl3

Chemical Family

halogenated, aliphatic

Recommended Use

industrial

Restrictions on Use

None known.

Manufacturer Information

MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with 29 CFR 1910.1200

Acute Toxicity (Inhalation), Category 4
Skin Corrosion / Irritation, Category 2
Eye Damage / Irritation, Category 2A
Toxic to Reproduction, Category 2
Specific Target Organ Toxicity - Single Exposure, Category 1 (central nervous system and heart)
Specific Target Organ Toxicity - Single Exposure, Category 3 (respiratory system)
Specific Target Organ Toxicity - Repeated Exposure, Category 1 (central nervous system, heart, and liver)
Specific Target Organ Toxicity - Repeated Exposure, Category 2 (brain, lungs, and nervous system)
Hazardous to the Aquatic Environment - Acute Hazard, Category 2
Hazardous to the Aquatic Environment - Chronic Hazard, Category 2
Hazardous for the ozone layer, Category 1

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Hazard Statement(s)

Harmful if inhaled
Causes skin irritation
Causes serious eye irritation
Suspected of damaging fertility or the unborn child
Causes damage to central nervous system and heart.
May cause respiratory tract irritation.
Causes damage to central nervous system, heart, and liver through prolonged or repeated exposure.
May cause damage to brain, lungs, nervous system through prolonged or repeated exposure.
Toxic to aquatic life with long lasting effects
Harms public health and the environment by destroying ozone in the upper atmosphere

Precautionary Statement(s)

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves and eye/face protection. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.

Response

IF exposed: Call a POISON CENTER or doctor/physician. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal

Dispose of in accordance with applicable regulations.
Refer to manufacturer/supplier for information on recovery/recycling.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component	Percent
71-55-6	METHYL CHLOROFORM	100

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following:
Trichloroethane (25323-89-1).

Section 4 - FIRST AID MEASURES

Description of Necessary Measures

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Eyes

Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion

If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

Most Important Symptoms/Effects

Acute

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, central nervous system damage, heart damage

Delayed

central nervous system damage, heart damage, liver damage, reproductive effects, lung damage, brain damage, nervous system damage

Indication of Immediate Medical Attention and Special Treatment

For inhalation, consider oxygen.

* * *Section 5 - FIRE FIGHTING MEASURES* * *

Suitable Extinguishing Media

carbon dioxide, regular dry chemical, water spray

Large fires: Use dry chemical, carbon dioxide, alcohol-resistant foam or water spray.

Unsuitable Extinguishing Media

Do not scatter spilled material with high-pressure water streams.

Specific Hazards Arising from the Chemical

Slight fire hazard.

Hazardous Combustion Products

Combustion: hydrogen chloride, phosgene, oxides of carbon

Fire Fighting Measures

Move container from fire area if it can be done without risk. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with water spray until well after the fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

* * *Section 6 - ACCIDENTAL RELEASE MEASURES* * *

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. Eliminate all ignition sources if safe to do so. Stop leak if possible without personal risk. **Small spills:** Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. **Large spills:** Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves and eye/face protection. Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Avoid release to the environment.

Conditions for Safe Storage, including any Incompatibilities

Store and handle in accordance with all current regulations and standards. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in a cool, dry place. Keep separated from incompatible substances.

Incompatibilities combustible materials, bases, metals, oxidizing materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

METHYL CHLOROFORM (71-55-6)

ACGIH: 350 ppm TWA

450 ppm STEL

Europe: 100 ppm TWA; 555 mg/m³ TWA

200 ppm STEL; 1110 mg/m³ STEL

OSHA (Final): 350 ppm TWA; 1900 mg/m³ TWA

OSHA (Vacated): 350 ppm TWA; 1900 mg/m³ TWA

450 ppm STEL; 2450 mg/m³ STEL

NIOSH: 350 ppm Ceiling (15 min); 1900 mg/m³ Ceiling (15 min)

Component Biological Limit Values

METHYL CHLOROFORM (71-55-6)

ACGIH: 40 ppm Medium: end-exhaled air Time: prior to last shift of workweek Parameter: Methyl chloroform; 10 mg/L Medium: urine Time: end of workweek Parameter: Trichloroacetic acid (nonspecific, semi-quantitative); 30 mg/L Medium: urine Time: end of shift at end of workweek Parameter: Total trichloroethanol (nonspecific, semi-quantitative); 1 mg/L Medium: blood Time: end of shift at end of workweek Parameter: Total trichloroethanol (nonspecific)

IDLH

700 ppm

Appropriate Engineering Controls

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eyes/Face Protection

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection

Wear appropriate chemical resistant clothing.

Glove Recommendations

Wear appropriate chemical resistant gloves.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

700 ppm

Any supplied-air respirator.

Safety Data Sheet

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Any self-contained breathing apparatus with a full facepiece.

Emergency or planned entry into unknown concentrations or IDLH conditions -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape -

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid	Appearance:	clear, colorless liquid
Color:	colorless	Physical Form:	volatile liquid
Odor:	sweet odor	Odor Threshold:	44 - 100 ppm
pH:	Not available	Melting/Freezing Point:	-32 °C
Boiling Point:	74 °C	Flash Point:	>93.3 °C
Decomposition:	Not available	Evaporation Rate:	5.0 (butyl acetate=1)
LEL:	7.5 %	UEL:	12.5 %
Vapor Pressure:	100 mmHg @ 20 °C	Henry's Law Constant:	0.072 atm-cu m/mole @ 25°C
Vapor Density (air = 1):	4.55	Specific Gravity (water=1):	1.3390
Water Solubility:	0.078 % @ 25 °C	Log KOW:	2.49
KOC:	17823.79 estimated from water solubility	Auto Ignition:	537 °C
Viscosity:	0.858 cP @20 °C	Volatility:	100%
Molecular Weight:	133.40	Molecular Formula:	C-H3-C-Cl3

Other Property Information

No additional information is available.

Solvent Solubility

Soluble: acetone, benzene, chloroform, methanol, ethanol, carbon disulfide, ether, carbon tetrachloride, heptane

Section 10 - STABILITY AND REACTIVITY

Reactivity

No reactivity hazard is expected.

Chemical Stability

Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

Incompatible Materials

combustible materials, bases, metals, oxidizing materials

Hazardous Decomposition

Combustion: hydrogen chloride, phosgene, oxides of carbon

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Section 11 - TOXICOLOGICAL INFORMATION

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

METHYL CHLOROFORM (71-55-6)

Dermal LD50 Rabbit >15800 mg/kg; Inhalation LC50 Rat 18000 ppm 4 h; Oral LD50 Rat >2000 mg/kg

RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

METHYL CHLOROFORM (71-55-6)

Inhalation: 24400 mg/m3 Inhalation Cat LC50; 29492 ppm/10 minute(s) Inhalation Mouse LC50; 3911 ppm/2 hour Inhalation Mouse LC50; 20000 ppm/2 hour Inhalation Rat LC50; 14250 ppm/7 hour Inhalation Rat LC50; 17000 ppm/4 hour Inhalation Rat LC50

Acute Toxicity Level

METHYL CHLOROFORM (71-55-6)

Slightly Toxic: inhalation, dermal absorption, ingestion

Information on Likely Routes of Exposure

Inhalation

irritation, changes in blood pressure, nausea, vomiting, diarrhea, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, mood swings, loss of coordination, blood disorders, heart disorders, kidney damage, liver damage, convulsions, unconsciousness, coma, heart damage, reproductive effects

Ingestion

irritation, nausea, vomiting, diarrhea, stomach pain, irregular heartbeat, headache, drowsiness, dizziness, disorientation, loss of coordination, kidney damage, liver damage, convulsions, unconsciousness, coma, reproductive effects

Skin Contact

irritation (possibly severe)

Eye Contact

irritation

Immediate Effects

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, central nervous system damage, heart damage

Delayed Effects

central nervous system damage, heart damage, liver damage, reproductive effects, brain damage, lung damage, nervous system damage

Medical Conditions Aggravated by Exposure

heart or cardiovascular disorders, kidney disorders, liver disorders, skin disorders and allergies

Irritation/Corrosivity Data

respiratory tract irritation, skin irritation, eye irritation

RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

METHYL CHLOROFORM (71-55-6)

450 ppm/8 hour Eyes Man; 100 mg Eyes Rabbit mild; 2 mg/24 hour Eyes Rabbit severe; 5 gm/12 day(s) intermittent Skin Rabbit mild; 20 mg/24 hour Skin Rabbit moderate

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Local Effects

METHYL CHLOROFORM (71-55-6)

Irritant: inhalation, skin, eye

Target Organs

METHYL CHLOROFORM (71-55-6)

central nervous system

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Carcinogenicity

Component Carcinogenicity

METHYL CHLOROFORM (71-55-6)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Supplement 7 [1987]; Monograph 20 [1979] (Group 3 (not classifiable))

RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Reproductive Effects Data

Available data characterizes this substance as a reproductive hazard.

RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes the following endpoints:

METHYL CHLOROFORM (71-55-6)

2100 ppm Inhalation Rat TCl₀ (6 hour, pregnant 1-20 day(s)); 7000 ppm Inhalation Rat TCl₀ (3 hour, pregnant 13-19 day(s)); 43 mg/kg Oral Rat TDLo (pregnant 1-22 day(s), 21 day(s))

RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Additional Data

Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

Specific Target Organ Toxicity - Single Exposure

central nervous system, heart, respiratory system

Specific Target Organ Toxicity - Repeated Exposure

central nervous system, heart, liver, brain, lungs, nervous system

Aspiration Hazard

Not expected to be an aspiration hazard.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

Toxic to aquatic life with long lasting effects.

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

Component Analysis - Aquatic Toxicity

METHYL CHLOROFORM (71-55-6)

Fish: 96 Hr LC50 Pimephales promelas: 35.2 - 50.7 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 57 - 90 mg/L [static] (juvenile); 96 Hr LC50 Cyprinus carpio: 56 mg/L [flow-through]; 96 Hr LC50 Poecilia reticulata: 52.9 mg/L [flow-through]; 96 Hr LC50 Poecilia reticulata: 69.7 mg/L [static]; 96 Hr LC50 Pimephales promelas: 91 - 126 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 46 - 59 mg/L [static]

Algae: 96 Hr EC50 Pseudokirchneriella subcapitata: >500 mg/L

Invertebrate: 48 Hr LC50 Daphnia magna: >530 mg/L; 48 Hr EC50 Daphnia magna: 2384 mg/L; 48 Hr EC50 Daphnia magna: 9.7 - 12.8 mg/L [Static]

Persistence and Degradability

This material may biodegrade in soil and water.

Bioaccumulative Potential

Bioconcentration potential in aquatic organisms is low based on BCF value of 0.7-4.9.

Mobility

Expected to have high mobility in soil.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations.

Component Waste Numbers

METHYL CHLOROFORM (71-55-6)

RCRA: waste number U226

Section 14 - TRANSPORT INFORMATION

US DOT Information

Shipping Name: 1,1,1-Trichloroethane
UN/NA #: UN2831 **Hazard Class:** 6.1 **Packing Group:** III
Required Label(s): 6.1

IMDG Information

Shipping Name: 1,1,1-Trichloroethane
UN #: UN2831 **Hazard Class:** 6.1 **Packing Group:** III
Required Label(s): 6.1

Section 15 - REGULATORY INFORMATION

Component Analysis

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

METHYL CHLOROFORM (71-55-6)

SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

SARA 311/312 Hazardous Categories

Acute Health: Yes **Chronic Health:** Yes **Fire:** No **Pressure:** No **Reactive:** No

Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
METHYL CHLOROFORM	71-55-6	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
METHYL CHLOROFORM	71-55-6	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

* * *Section 16 - OTHER INFORMATION* * *

NFPA Ratings: Health: 2 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

Matheson Tri-Gas, Inc. makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Matheson Tri-Gas, Inc. shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.

End of Sheet MAT14370

Methyl chloride (Refrigerant gas R 40)

Safety Data Sheet P-4622

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1980

Revision date: 10/17/2016

Supersedes: 10/14/2015

SECTION: 1. Product and company identification

1.1. Product identifier

Product form : Substance
Name : Methyl chloride (Refrigerant gas R 40)
CAS No : 74-87-3
Formula : CH₃Cl
Other means of identification : methylchloride, halocarbon 40, monochloromethane

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Gas 1 H220
Liquefied gas H280
Acute Tox. 4 (Inhalation:gas) H332
Carc. 2 H351
STOT RE 2 H373

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H220 - **EXTREMELY FLAMMABLE GAS**
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H332 - HARMFUL IF INHALED
H351 - SUSPECTED OF CAUSING CANCER
H373 - MAY CAUSE DAMAGE TO ORGANS (LUNG, KIDNEYS, LIVER, CENTRAL NERVOUS SYSTEM) THROUGH PROLONGED OR REPEATED EXPOSURE
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
CGA-HG01 - MAY CAUSE FROSTBITE

Precautionary statements (GHS-US) :
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P260 - Do not breathe gas

Methyl chloride (Refrigerant gas R 40)

Safety Data Sheet P-4622

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1980 Revision date: 10/17/2016 Supersedes: 10/14/2015

P262 - Do not get in eyes, on skin, or on clothing
P271+P403 - Use and store only outdoors or in a well-ventilated place
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
P405 - Store locked up
P501 - Dispose of contents/container in accordance with container Supplier/owner instructions
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG06 - Close valve after each use and when empty
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

2.3. Other hazards

Other hazards not contributing to the classification : Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Methyl chloride (Refrigerant gas R 40) (Main constituent)	(CAS No) 74-87-3	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog. Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : **EXTREMELY FLAMMABLE GAS.** If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Methyl chloride (Refrigerant gas R 40)

Safety Data Sheet P-4622

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1980 Revision date: 10/17/2016 Supersedes: 10/14/2015

Explosion hazard : **EXTREMELY FLAMMABLE GAS.** Forms explosive mixtures with air and oxidizing agents.
Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : **DANGER! Toxic, flammable liquefied gas**

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Other information : Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER: Flammable, liquefied gas. FORMS EXPLOSIVE MIXTURES WITH AIR.** Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

Methyl chloride (Refrigerant gas R 40)

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This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methyl chloride (Refrigerant gas R 40) (74-87-3)		
ACGIH	ACGIH TLV-TWA (ppm)	50 ppm
ACGIH	ACGIH TLV-STEL (ppm)	100 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	100 ppm
USA OSHA	OSHA PEL (Ceiling) (ppm)	200 ppm
USA IDLH	US IDLH (mg/m ³)	≈ mg/m ³
USA IDLH	US IDLH (ppm)	2000 ppm

8.2. Exposure controls

Appropriate engineering controls : Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting. A canopy-type, forced-draft fume hood is preferred.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Colorless gas.

Molecular mass : 50.5 g/mol

Color : Colorless.

Methyl chloride (Refrigerant gas R 40)

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Odor	: Sweetish. Ethereal.
Odor threshold	: < 0.01 ppm
pH	: Not applicable.
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -97.7 °C (-143.86°F)
Freezing point	: No data available
Boiling point	: -24.2 °C (-11.6°F)
Flash point	: Not applicable.
Critical temperature	: 143.1 °C (289.6°F)
Auto-ignition temperature	: 632 °C (1170°F)
Decomposition temperature	: No data available
Flammability (solid, gas)	: 8.1 - 17.4 vol %
Vapor pressure	: 5.1 bar (73.4 psia) (@21.1°C/70°F)
Critical pressure	: 66.5 bar (966 psia)
Relative vapor density at 20 °C	: No data available
Relative density	: 0.92 (at 20°C/68°F)
Density	: 0.921 g/cm ³ (at 20 °C)
Relative gas density	: 1.743 (at 21.1°C/70°F, 1 atm)
Solubility	: Water: 6310 mg/l
Log Pow	: 0.91
Log Kow	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosion limits	: No data available

9.2. Other information

Gas group	: Liquefied gas
Additional information	: Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

Avoid temperature above 752°F (400°C).

10.5. Incompatible materials

May react with aluminium. Reaction with aluminum may form pyrophoric trimethyl aluminum or aluminum alkyls. Oxidizing agents. Magnesium. Zinc. Potassium. Sodium. Aluminum chloride. Ethylene. Moisture. Rubber.

10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide. Chlorine. On heating/burning: release of toxic and corrosive gases/vapors hydrogen chloride : formation of small quantities of phosgene.

Methyl chloride (Refrigerant gas R 40)

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: HARMFUL IF INHALED.

Methyl chloride (Refrigerant gas R 40) (1f)74-87-3	
LD50 oral rat	1800 mg/kg
LC50 inhalation rat (mg/l)	5300 mg/m ³ (Exposure time: 4 h)
LC50 inhalation rat (ppm)	8300 ppm/1h
ATE US (oral)	1800.000 mg/kg body weight
ATE US (gases)	8300.000 ppm/1h

Skin corrosion/irritation : Not classified
pH: Not applicable.

Serious eye damage/irritation : Not classified
pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : SUSPECTED OF CAUSING CANCER.

Methyl chloride (Refrigerant gas R 40) (74-87-3)	
IARC group	3 - Not classifiable
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: MAY CAUSE DAMAGE TO ORGANS (LUNG, KIDNEYS, LIVER, CENTRAL NERVOUS SYSTEM) THROUGH PROLONGED OR REPEATED EXPOSURE.
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

Methyl chloride (Refrigerant gas R 40) (74-87-3)	
LC50 fish 1	550 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

12.2. Persistence and degradability

Methyl chloride (Refrigerant gas R 40) (74-87-3)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

12.3. Bioaccumulative potential

Methyl chloride (Refrigerant gas R 40) (74-87-3)	
Log Pow	0.91
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Methyl chloride (Refrigerant gas R 40) (74-87-3)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.
Effect on ozone layer : None
Global warming potential [CO₂=1] : 13
Effect on the global warming : Contains Fluorinated greenhouse gases covered by the Kyoto protocol

Methyl chloride (Refrigerant gas R 40)

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Regional legislation (waste) : U.S. - RCRA (Resource Conservation & Recovery Act) - Basis for Listing - Appendix VII. U.S. - RCRA (Resource Conservation & Recovery Act) - Constituents for Detection Monitoring. U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261. U.S. - RCRA (Resource Conservation & Recovery Act) - List for Hazardous Constituents. U.S. - RCRA (Resource Conservation & Recovery Act) - Part 268 Appendix III - Halogenated Organic Compounds (HOCs). U.S. - RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards. U.S. - RCRA (Resource Conservation & Recovery Act) - TSD Facilities Ground Water Monitoring. U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes - Acutely Toxic Wastes & Other Hazardous Characteristics.
- Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

- In accordance with DOT
- Transport document description : UN1063 Methyl chloride, 2.1
- UN-No.(DOT) : UN1063
- Proper Shipping Name (DOT) : Methyl chloride
- Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115
- Hazard labels (DOT) : 2.1 - Flammable gas



- DOT Special Provisions (49 CFR 172.102) : N86 - UN pressure receptacles made of aluminum alloy are not authorized
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter

Additional information

- Emergency Response Guide (ERG) Number : 115
- Other information : No supplementary information available.
- Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
- Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

- UN-No. (IMDG) : 1063
- Proper Shipping Name (IMDG) : METHYL CHLORIDE (REFRIGERANT GAS R 40)
- Class (IMDG) : 2 - Gases
- MFAG-No : 115

Air transport

- UN-No. (IATA) : 1063
- Proper Shipping Name (IATA) : Methyl chloride
- Class (IATA) : 2
- Civil Aeronautics Law : Gases under pressure/Gases flammable under pressure

Methyl chloride (Refrigerant gas R 40)

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SECTION 15: Regulatory information

15.1. US Federal regulations

Methyl chloride (Refrigerant gas R 40) (74-87-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	100 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Sudden release of pressure hazard Fire hazard
SARA Section 313 - Emission Reporting	1.0 %

15.2. International regulations

CANADA

Methyl chloride (Refrigerant gas R 40) (74-87-3)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Methyl chloride (Refrigerant gas R 40) (74-87-3)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Methyl chloride (Refrigerant gas R 40) (74-87-3)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Japanese Poisonous and Deleterious Substances Control Law
Japanese Pollutant Release and Transfer Register Law (PRTR Law)
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

Methyl chloride (Refrigerant gas R 40)(74-87-3)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Yes
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

Methyl chloride (Refrigerant gas R 40)

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SECTION 16: Other information

Other information

: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's obligation to determine the conditions of safe use of the product

Praxair SDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.com. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (Phone: 1-800-PRAXAIR/1-800-772-9247; Address: Praxair Call Center, Praxair, Inc, P.O. Box 44, Tonawanda, NY 14151-0044)

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NFPA health hazard

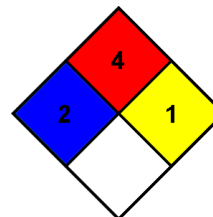
: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard

: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity

: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health

: 2 Moderate Hazard - Temporary or minor injury may occur

Flammability

: 4 Severe Hazard

Physical

: 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : *m*-Xylene

Product Number : 95670
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 108-38-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 3), H226
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H226 : Flammable liquid and vapour.
H304 : May be fatal if swallowed and enters airways.
H312 : Harmful in contact with skin.
H315 : Causes skin irritation.
H319 : Causes serious eye irritation.
H335 : May cause respiratory irritation.

H412	Harmful to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 1,3-Dimethylbenzene
Formula	: C ₈ H ₁₀
Molecular weight	: 106.17 g/mol
CAS-No.	: 108-38-3
EC-No.	: 203-576-3
Index-No.	: 601-022-00-9

Hazardous components

Component	Classification	Concentration
m-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 3; Aquatic Chronic 3; H226, H304, H312, H315, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
m-Xylene	108-38-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section)		

		Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
m-Xylene	108-38-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1,500.000 0 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid Colour: colourless
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: -48 °C (-54 °F) - lit.
f) Initial boiling point and boiling range	138 - 139 °C (280 - 282 °F) - lit.
g) Flash point	25.0 °C (77.0 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k) Vapour pressure	8.0 hPa (6.0 mmHg) at 20.0 °C (68.0 °F) 21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F)
l) Vapour density	No data available
m) Relative density	0.868 g/mL at 25 °C (77 °F)
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 3.2 at 20 °C (68 °F)
p) Auto-ignition temperature	465.0 °C (869.0 °F) 528.0 °C (982.4 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 6,602 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - Rat - male - 4 h - 6700 ppm
(Directive 67/548/EEC, Annex V, B.2.)

LD50 Dermal - Rabbit - male - 12,126 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Severe eye irritation - 24 h

Respiratory or skin sensitisation

- Mouse

Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (m-Xylene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Additional Information

RTECS: ZE2275000

Liver injury may occur., Kidney injury may occur., Blood disorders, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish mortality LC50 - Fish - 11.23 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to daphnia and Remarks: No data available
other aquatic
invertebrates

Toxicity to algae Remarks: No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.

H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5

Revision Date: 06/02/2016

Print Date: 06/21/2016

SAFETY DATA SHEET

Version 4.4
Revision Date 11/04/2015
Print Date 12/17/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Butylbenzene

Product Number : B90203
Brand : Aldrich

CAS-No. : 104-51-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H226

Flammable liquid and vapour.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242

Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P273

Avoid release to the environment.

P280

Wear protective gloves/ protective clothing/ eye protection/ face

P303 + P361 + P353	protection. IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 1-Phenylbutane
Formula	: C ₁₀ H ₁₄
Molecular weight	: 134.22 g/mol
CAS-No.	: 104-51-8
EC-No.	: 203-209-7

Hazardous components

Component	Classification	Concentration
Butylbenzene		
	Flam. Liq. 3; Aquatic Acute 1; Aquatic Chronic 1; H226, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -88 °C (-126 °F) - lit. |
| f) Initial boiling point and boiling range | 183 °C (361 °F) - lit. |
| g) Flash point | 59.0 °C (138.2 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | Upper explosion limit: 5.8 %(V)
Lower explosion limit: 0.8 %(V) |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 0.86 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | insoluble |
| o) Partition coefficient: n-octanol/water | log Pow: 4.26 |
| p) Auto-ignition temperature | 412.0 °C (773.6 °F) |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |

- s) Explosive properties No data available
- t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CY9070000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to daphnia and other aquatic invertebrates Immobilization EC50 - Daphnia magna (Water flea) - 0.34 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 2709 Class: 3 Packing group: III

Proper shipping name: Butyl benzenes

Marine pollutant: yes

Poison Inhalation Hazard: No

IMDG

UN number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D

Proper shipping name: BUTYLBENZENES

Marine pollutant: yes

IATA

UN number: 2709 Class: 3 Packing group: III

Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.4

Revision Date: 11/04/2015

Print Date: 12/17/2015



SAFETY DATA SHEET

Creation Date 26-Oct-2009

Revision Date 02-Apr-2014

Revision Number 1

1. Identification

Product Name n-Hexane

Cat No. : AC326920000; AC326920010; AC326920025; AC326921000; AC326922500

Synonyms Hex

Recommended Use Laboratory chemicals

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company	Entity / Business Name	Emergency Telephone Number
Fisher Scientific	Acros Organics	For information US call: 001-800-ACROS-01 /
One Reagent Lane	One Reagent Lane	Europe call: +32 14 57 52 11
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410	Emergency Number US :001-201-796-7100 /
Tel: (201) 796-7100		Europe : +32 14 57 52 99
		CHEMTREC Tel. No. US :001-800-424-9300 /
		Europe :001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Liver, Heart, Blood.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor

May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause drowsiness or dizziness
Suspected of damaging fertility
Causes damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

If skin irritation occurs: Get medical advice/attention

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention.

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician

Do NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Toxic to aquatic life with long lasting effects

3. Composition / Information on ingredients

Haz/Non-haz

Component	CAS-No	Weight %
Hexane	110-54-3	>95

4. First-aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Obtain medical attention. Aspiration into lungs can produce severe lung damage.
Ingestion	Do not induce vomiting. Call a physician or Poison Control Center immediately. If vomiting occurs, lean victim forward to reduce the risk of aspiration.
Most important symptoms/effects	Breathing difficulties. . Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.
Notes to Physician	Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media	CO ₂ , dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.
Unsuitable Extinguishing Media	Water may be ineffective, This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained.
Flash Point	-22°C / -7.6°F
Method -	No information available
Autoignition Temperature	223°C / 433.4°F
Explosion Limits	
Upper	7.5 vol %
Lower	1.1 vol %
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products Carbon monoxide (CO), Carbon dioxide (CO₂).

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPAHealth
2Flammability
3Instability
0Physical hazards
N/A**6. Accidental release measures****Personal Precautions**

Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Do not flush into surface water or sanitary sewer system. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

7. Handling and storage**Handling**

Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use explosion-proof equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection**Exposure Guidelines**

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hexane	TWA: 50 ppm Skin	(Vacated) TWA: 50 ppm (Vacated) TWA: 180 mg/m ³ TWA: 500 ppm TWA: 1800 mg/m ³	IDLH: 1100 ppm TWA: 50 ppm TWA: 180 mg/m ³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Hexane	TWA: 50 ppm TWA: 176 mg/m ³ Skin	TWA: 50 ppm TWA: 176 mg/m ³	TWA: 50 ppm Skin

Legend

ACGIH - American Conference of Governmental Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment**Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Petroleum distillates
Odor Threshold	No information available.
pH	No information available.
Melting Point/Range	-95°C / -139°F
Boiling Point/Range	69°C / 156.2°F @ 760 mmHg
Flash Point	-22°C / -7.6°F
Evaporation Rate	No information available.
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	7.5 vol %
Lower	1.1 vol %
Vapor Pressure	160 mbar @ 20 °C
Vapor Density	2.97
Relative Density	0.659
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	223°C / 433.4°F
Decomposition temperature	No information available.
Viscosity	0.31 mPa s at 20 °C
Molecular Formula	C ₆ H ₁₄
Molecular Weight	86.18

10. Stability and reactivity

Reactive Hazard	None known, based on information available.
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Heat, flames and sparks. Exposure to light. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents, Halogens
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂)
Hazardous Polymerization	Hazardous polymerization does not occur
Hazardous Reactions	None under normal processing

11. Toxicological information

Acute Toxicity**Product Information****Component Information**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hexane	25 g/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Hexane	110-54-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity Teratogenic effects have occurred in experimental animals..

STOT - single exposure Respiratory system, Central nervous system (CNS).

STOT - repeated exposure Liver, Heart, Blood.

Aspiration hazard No information available.

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hexane	Not listed	2.1 - 2.98 mg/L LC50 96 h	Not listed	EC50: 3.87 mg/L/48h

Persistence and Degradability Persistence is unlikely, based on information available.

Bioaccumulation/ Accumulation No information available

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Hexane	4.11

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1208
 Proper Shipping Name Hexanes
 Hazard Class 3
 Packing Group II

TDG

UN-No UN1208
 Proper Shipping Name HEXANES
 Hazard Class 3
 Packing Group II

IATA

UN-No UN1208
 Proper Shipping Name Hexanes
 Hazard Class 3
 Packing Group II

IMDG/IMO

UN-No UN1208
 Proper Shipping Name Hexanes
 Hazard Class 3
 Packing Group II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Hexane	X	X	-	203-777-6	-		X	X	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Hexane	110-54-3	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Hexane	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Hexane	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Hexane	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

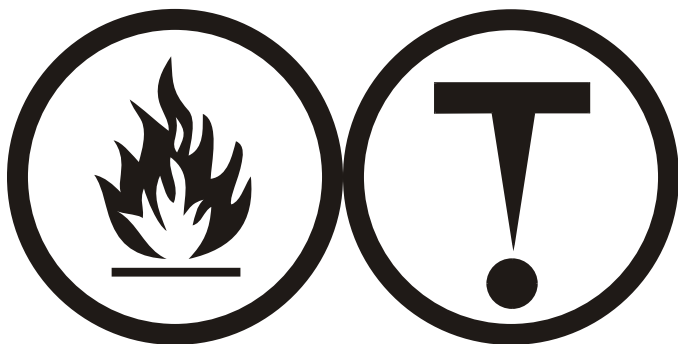
Other International Regulations

Mexico - Grade Serious risk, Grade 3

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class B2 Flammable liquid
D2A Very toxic materials



16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date

26-Oct-2009

Revision Date

02-Apr-2014

Print Date

02-Apr-2014

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 5.3

Revision Date 08/24/2015

Print Date 12/12/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : N-Nitrosodiphenylamine

Product Number : 48553

Brand : Supelco

CAS-No. : 86-30-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302

Acute aquatic toxicity (Category 2), H401

Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302

Harmful if swallowed.

H411

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P273

Avoid release to the environment.

P301 + P312 + P330

IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.

P391

Collect spillage.

P501

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Diphenylnitrosamine
Diphenylnitrosoamine
N-Nitroso-N-phenylaniline

Formula : $C_{12}H_{10}N_2O$
Molecular weight : 198.22 g/mol
CAS-No. : 86-30-6
EC-No. : 201-663-0

Hazardous components

Component	Classification	Concentration
N-Nitrosodiphenylamine		
	Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Nitrogen oxides (NO_x)

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: solid
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 65 - 66 °C (149 - 151 °F)
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	log Pow: 3.13
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Solubility in other solvents Methanol 100 g/l - soluble

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 1,825 mg/kg

Remarks: Cyanosis

Inhalation: No data available

LD50 Dermal - Rabbit - > 7,940 mg/kg

Remarks: Behavioral:Food intake (animal). Behavioral:Change in motor activity (specific assay).

No data available

Skin corrosion/irritation

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

Carcinogenicity

Carcinogenicity - Rat - Oral

Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

Carcinogenicity - Mouse - Skin

Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Tumorigenic:Increased incidence of tumors in susceptible strains.

Carcinogenicity - Rat - Oral

Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors. Skin and Appendages: Other: Tumors.

Carcinogenicity - Rat - Intraperitoneal

Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors. Endocrine:Tumors.

Carcinogenicity - Mouse - Oral

Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. Nitrosamines are suspected of causing cancers of the lung, nasal sinuses, brain, esophagus, stomach, liver, bladder, and kidney.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (N-Nitrosodiphenylamine)
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: JJ9800000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Bladder -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 5.8 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 7.8 mg/l - 48 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 14 d - 0.00921 mg/l
	Bioconcentration factor (BCF): 217

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (N-Nitrosodiphenylamine)

Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

H302	Harmful if swallowed.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3

Revision Date: 08/24/2015

Print Date: 12/12/2016

Material Safety Data Sheet

Version 4.0

Revision Date 07/28/2010

Print Date 12/27/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Propylbenzene

Product Number : P52407

Brand : Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Combustible Liquid

Target Organs

Lungs, Eyes, Kidney

GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H335 May cause respiratory irritation.
H401 Toxic to aquatic life.

Precautionary statement(s)

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P331 Do NOT induce vomiting.

HMIS Classification

Health hazard: 0
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0

NFPA Rating

Health hazard: 1
Fire: 2
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.

Ingestion

Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1-Phenylpropane

Formula : C₉H₁₂

Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Propylbenzene			
103-65-1	203-132-9	601-024-00-X	-

4. FIRST AID MEASURES**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES**Suitable extinguishing media**

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

For prolonged or repeated contact use protective gloves.

Eye protection

Face shield and safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-99 °C (-146 °F) - lit.
Boiling point	159 °C (318 °F) - lit.
Flash point	42.0 °C (107.6 °F) - closed cup
Ignition temperature	450 °C (842 °F)
Lower explosion limit	0.8 %(V)
Upper explosion limit	6 %(V)
Density	0.862 g/cm ³ at 25 °C (77 °F)
Water solubility	slightly soluble

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION**Acute toxicity**

LD50 Oral - rat - 6,040 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - rat - 2 h - 65000 ppm

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

RTECS: DA8750000

12. ECOLOGICAL INFORMATION**Toxicity**

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 1.55 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates. Immobilization EC50 - Daphnia magna (Water flea) - 2 mg/l - 24 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propyl benzene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 2364 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: PROPYLBENZENE
Marine pollutant: No

IATA

UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propylbenzene

15. REGULATORY INFORMATION

OSHA Hazards

Combustible Liquid

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

Propylbenzene

CAS-No.
103-65-1Revision Date
2007-03-01**Pennsylvania Right To Know Components**

Propylbenzene

CAS-No.
103-65-1Revision Date
2007-03-01**New Jersey Right To Know Components**

Propylbenzene

CAS-No.
103-65-1Revision Date
2007-03-01**California Prop. 65 Components**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Further information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 5.0

Revision Date 11/13/2012

Print Date 03/19/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : o-Xylene

Product Number : 95660

Brand : Fluka

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Flammable liquid, Harmful by skin absorption., Irritant, Reproductive hazard

Target Organs

Liver, Kidney, Nerves.

GHS Classification

Flammable liquids (Category 3)

Acute toxicity, Inhalation (Category 4)

Acute toxicity, Dermal (Category 4)

Skin irritation (Category 2)

Acute aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H226

Flammable liquid and vapour.

H312 + H332

Harmful in contact with skin or if inhaled

H315

Causes skin irritation.

H401

Toxic to aquatic life.

Precautionary statement(s)

P280

Wear protective gloves/ protective clothing.

HMIS Classification

Health hazard:

2

Chronic Health Hazard:

*

Flammability:

3

Physical hazards:

1

NFPA Rating
Health hazard: 2
Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,2-Dimethylbenzene

Formula : C₈H₁₀

Molecular Weight : 106.17 g/mol

Component		Concentration
o-Xylene		
CAS-No.	95-47-6	-
EC-No.	202-422-2	
Index-No.	601-022-00-9	

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
o-Xylene	95-47-6	STEL	150 ppm 655 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	100 ppm 435 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	100 ppm 434 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Not classifiable as a human carcinogen			
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen			
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen			
		TWA	100 ppm 435 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	100 ppm 435 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 655 mg/m ³	USA. NIOSH Recommended Exposure Limits

Personal protective equipment**Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: > 480 min

Material tested: Vitoject® (Aldrich Z677698, Size M)

Splash protection

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: > 30 min

Material tested: Camatril® (Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -26 - -23 °C (-15 - -9 °F) - lit.
Boiling point	143 - 145 °C (289 - 293 °F) - lit.
Flash point	31.0 °C (87.8 °F) - closed cup
Ignition temperature	464 °C (867 °F)
Autoignition temperature	464.0 °C (867.2 °F)
Lower explosion limit	0.9 %(V)
Upper explosion limit	6.7 %(V)
Vapour pressure	21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F) 8.8 hPa (6.6 mmHg) at 25.0 °C (77.0 °F)
Density	0.879 g/mL at 20 °C (68 °F)
Water solubility	no data available
Partition coefficient:	log Pow: 3.12

n-octanol/water	
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

no data available

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

LD50 Intraperitoneal - mouse - 1,364 mg/kg

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (o-Xylene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Suspected human reproductive toxicant

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Synergistic effects

no data available

Additional Information

RTECS: ZE2450000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - <i>Lepomis macrochirus</i> (Bluegill) - 16.10 mg/l - 96 h LC50 - <i>Carassius auratus</i> (goldfish) - 13.00 mg/l - 24 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - <i>Daphnia magna</i> (Water flea) - 1.39 - 1.87 mg/l - 48 h
Toxicity to algae	EC50 - <i>Pseudokirchneriella subcapitata</i> (green algae) - 4.70 mg/l - 72 h EC50 - <i>Chlorella vulgaris</i> (Fresh water algae) - 55.00 mg/l - 24 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS**Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES
Marine pollutant: No

IATA

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION**OSHA Hazards**

Flammable liquid, Harmful by skin absorption., Irritant, Reproductive hazard

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Further information**

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SAFETY DATA SHEET

Version 4.10
Revision Date 11/12/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *p*-Cresol

Product Number : W233706

Brand : Aldrich

Index-No. : 604-004-00-9

CAS-No. : 106-44-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

Acute toxicity, Dermal (Category 3), H311

Skin corrosion (Category 1B), H314

Serious eye damage (Category 1), H318

Acute aquatic toxicity (Category 2), H401

Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301 + H311

H314

H411

Toxic if swallowed or in contact with skin

Causes severe skin burns and eye damage.

Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P260

P264

P270

Do not breathe dust or mist.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
P322	Specific measures (see supplemental first aid instructions on this label).
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 4-Methylphenol
Formula	: C ₇ H ₈ O
Molecular weight	: 108.14 g/mol
CAS-No.	: 106-44-5
EC-No.	: 203-398-6
Index-No.	: 604-004-00-9

Hazardous components

Component	Classification	Concentration
p-Cresol		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 2; H301 + H311, H314, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

hygroscopic Air and light sensitive. Handle and store under inert gas.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Cresol	106-44-5	TWA	2.3 ppm 10 mg/m ³	USA. NIOSH Recommended Exposure Limits
		TWA	5 ppm 22 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation The value in mg/m ³ is approximate.		

		TWA	20 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 30 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---------------------------|--|
| a) Appearance | Form: crystalline
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing | Melting point/range: 31 - 37 °C (88 - 99 °F) |

	point	Melting point/range: 32 - 34 °C (90 - 93 °F) - lit.
f)	Initial boiling point and boiling range	202 °C (396 °F) - lit.
g)	Flash point	85.0 °C (185.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.034 g/cm ³ at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 1.94
p)	Auto-ignition temperature	559.0 °C (1,038.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents, Bases

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 207.0 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Other changes.

Behavioral:Convulsions or effect on seizure threshold. Gastrointestinal:Ulceration or bleeding from stomach.

LC50 Inhalation - Rat - 1 h - > 710 mg/m³

LD50 Dermal - Rabbit - 301.0 mg/kg

Remarks: Behavioral:Tremor. Gastrointestinal:Changes in structure or function of salivary glands. Kidney, Ureter, Bladder:Other changes.

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Severe eye irritation

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: GO6475000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, laryngitis, Dizziness, Cardiovascular effects., Muscle cramps/spasms., Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 16.00 - 24.00 mg/l - 24 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 7.9 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 1.4 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3455 Class: 6.1 (8) Packing group: II EMS-No: F-A, S-B
Proper shipping name: CRESOLS, SOLID

IATA

UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10

Revision Date: 11/12/2015

Print Date: 02/07/2016

SAFETY DATA SHEET

Version 4.2
Revision Date 07/09/2014
Print Date 04/20/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : 1,4-Diethylbenzene

Product Number : D91004
Brand : Aldrich

CAS-No. : 105-05-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 3), H226

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H226

Flammable liquid and vapour.

H315

Causes skin irritation.

H319

Causes serious eye irritation.

H335

May cause respiratory irritation.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242

Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P321	Specific treatment (see supplemental first aid instructions on this label).
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₁₀ H ₁₄
Molecular Weight	: 134.22 g/mol
CAS-No.	: 105-05-5
EC-No.	: 203-265-2

Hazardous components

Component	Classification	Concentration
1,4-Diethylbenzene		
	Flam. Liq. 3; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; H226, H315, H319, H335	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

- 4.3 Indication of any immediate medical attention and special treatment needed**
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

impervious clothing, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|---|
| a) Appearance | Form: clear, liquid
Colour: colourless |
| b) Odour | no data available |
| c) Odour Threshold | no data available |
| d) pH | no data available |
| e) Melting point/freezing point | Melting point/range: -43 °C (-45 °F) - lit. |
| f) Initial boiling point and boiling range | 184 °C (363 °F) - lit. |
| g) Flash point | 55 °C (131 °F) - closed cup |
| h) Evaporation rate | no data available |
| i) Flammability (solid, gas) | no data available |
| j) Upper/lower flammability or | no data available |

explosive limits

- | | | |
|----|--|--|
| k) | Vapour pressure | no data available |
| l) | Vapour density | 4.63 - (Air = 1.0) |
| m) | Relative density | 0.862 g/cm ³ at 25 °C (77 °F) |
| n) | Water solubility | no data available |
| o) | Partition coefficient: n-octanol/water | no data available |
| p) | Auto-ignition temperature | no data available |
| q) | Decomposition temperature | no data available |
| r) | Viscosity | no data available |
| s) | Explosive properties | no data available |
| t) | Oxidizing properties | no data available |

9.2 Other safety information

Relative vapour density 4.63 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

no data available

Dermal: no data available

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

no data available

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2049 Class: 3 Packing group: III
Proper shipping name: Diethylbenzene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 2049 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: DIETHYLBENZENE
Marine pollutant: No

IATA

UN number: 2049 Class: 3 Packing group: III
Proper shipping name: Diethylbenzene

15. REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Diethylbenzene	105-05-5	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Diethylbenzene	105-05-5	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Diethylbenzene	105-05-5	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	2

Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.2

Revision Date: 07/09/2014

Print Date: 04/20/2016

SAFETY DATA SHEET

Version 4.5
Revision Date 07/08/2014
Print Date 10/12/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4-Ethyltoluene

Product Number : E49800
Brand : Aldrich

CAS-No. : 622-96-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226

Aspiration hazard (Category 1), H304

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H226

Flammable liquid and vapour.

H304

May be fatal if swallowed and enters airways.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242

Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P310

IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: C ₉ H ₁₂
Molecular Weight	: 120.19 g/mol
CAS-No.	: 622-96-8
EC-No.	: 210-761-2

Hazardous components

Component	Classification	Concentration
4-Ethyltoluene		
	Flam. Liq. 3; Asp. Tox. 1; H226, H304	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: clear, liquid
Colour: light yellow |
| b) Odour | no data available |
| c) Odour Threshold | no data available |
| d) pH | no data available |
| e) Melting point/freezing point | no data available |
| f) Initial boiling point and boiling range | 162 °C (324 °F) - lit. |
| g) Flash point | 43 °C (109 °F) - closed cup |
| h) Evapouration rate | no data available |
| i) Flammability (solid, gas) | no data available |
| j) Upper/lower flammability or explosive limits | no data available |
| k) Vapour pressure | no data available |
| l) Vapour density | no data available |
| m) Relative density | 0.861 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | no data available |
| o) Partition coefficient: n-octanol/water | no data available |
| p) Auto-ignition temperature | no data available |
| q) Decomposition temperature | no data available |
| r) Viscosity | no data available |
| s) Explosive properties | no data available |

t) Oxidizing properties no data available

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - rat - 4,850 mg/kg

Remarks: Behavioral:Convulsions or effect on seizure threshold. Behavioral:Ataxia.

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

mouse

Sister chromatid exchange

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Reproductive toxicity - rat - Oral

Maternal Effects: Other effects. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Additional Information

RTECS: XT2550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3295 Class: 3 Packing group: III

Proper shipping name: Hydrocarbons, liquid, n.o.s.

Marine pollutant: No

Poison Inhalation Hazard: No

IMDG

UN number: 3295 Class: 3 Packing group: III

EMS-No: F-E, S-D

Proper shipping name: HYDROCARBONS, LIQUID, N.O.S.

Marine pollutant: No

IATA

15. REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
4-Ethyltoluene	622-96-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date
4-Ethyltoluene	622-96-8	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

SAFETY DATA SHEET

Version 3.10
Revision Date 03/03/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Potassium

Product Number : 244864
Brand : Aldrich

CAS-No. : 7440-09-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260

Skin corrosion (Category 1A), H314

Serious eye damage (Category 1), H318

Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)
H260

In contact with water releases flammable gases which may ignite spontaneously.

H314

Causes severe skin burns and eye damage.

H318

Causes serious eye damage.

H350

May cause cancer.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P223

Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.
May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : K
Molecular weight : 39.10 g/mol

Hazardous components

Component		Classification	Concentration
Potassium			
CAS-No.	7440-09-7	Water-react. 1; Skin Corr. 1A; Eye Dam. 1; H260, H314	>= 90 - <= 100 %
EC-No.	231-119-8		
Index-No.	019-001-00-2		
Paraffin oils			
CAS-No.	8012-95-1	Carc. 1A; H350	>= 1 - < 5 %
EC-No.	232-384-2		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Dry powder

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Potassium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

Handle and store under inert gas.

Storage class (TRGS 510): Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Paraffin oils	8012-95-1	STEL	10.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation 2014 Adoption Not classifiable as a human carcinogen		
		Upper Respiratory Tract irritation 2014 Adoption Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|---|
| a) Appearance | Form: Fragments
Colour: grey |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 64 °C (147 °F) |
| f) Initial boiling point and boiling range | 774 °C (1,425 °F) at 1,013 hPa (760 mmHg) |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower | No data available |

flammability or
explosive limits

- | | | |
|----|--|---|
| k) | Vapour pressure | 0.12 hPa (0.09 mmHg) at 260 °C (500 °F) |
| l) | Vapour density | No data available |
| m) | Relative density | 0.860 g/cm ³ |
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | No data available |
| p) | Auto-ignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

Oxidizing agents, Strong oxidizing agents, Carbon oxides, Reacts violently with water., Reacts with water to generate Hydrogen gas.

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Paraffin oils)

NTP: Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Paraffin oils)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 2257 Class: 4.3 Packing group: I
Proper shipping name: Potassium
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

UN number: 2257 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: POTASSIUM

IATA

UN number: 2257 Class: 4.3 Packing group: I
Proper shipping name: Potassium
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Potassium	7440-09-7	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Potassium	7440-09-7	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Potassium	7440-09-7	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	8012-95-1	1987-02-27
Paraffin oils		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.
Skin Corr.	Skin corrosion
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard: 3

Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	3
Fire Hazard:	4
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.10

Revision Date: 03/03/2015

Print Date: 02/07/2016

SAFETY DATA SHEET

Version 3.9
Revision Date 05/23/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : *p*-Xylene

Product Number : 95680
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 106-42-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H226

Flammable liquid and vapour.

H312 + H332

Harmful in contact with skin or if inhaled

H315

Causes skin irritation.

H401

Toxic to aquatic life.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER/doctor if you feel unwell.
P322	Specific measures (see supplemental first aid instructions on this label).
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 1,4-Dimethylbenzene
Formula	: C ₈ H ₁₀
Molecular weight	: 106.17 g/mol
CAS-No.	: 106-42-3
EC-No.	: 203-396-5
Index-No.	: 601-022-00-9

Hazardous components

Component	Classification	Concentration
p-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Aquatic Acute 2; H226, H312 + H332, H315, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Xylene	106-42-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation		

		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		

		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
p-Xylene	106-42-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1,500.000 0 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: liquid, clear Colour: colourless
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	13.0 °C (55.4 °F)
f) Initial boiling point and boiling range	137.0 - 138.0 °C (278.6 - 280.4 °F)
g) Flash point	25.0 °C (77.0 °F) - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k) Vapour pressure	21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F) 12.0 hPa (9.0 mmHg) at 20.0 °C (68.0 °F)
l) Vapour density	No data available
m) Relative density	0.86 g/cm ³
n) Water solubility	0.2 g/l
o) Partition coefficient: n-octanol/water	log Pow: 3.15
p) Auto-ignition temperature	529.0 °C (984.2 °F)
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Surface tension	28.3 mN/m at 20.0 °C (68.0 °F)
-----------------	--------------------------------

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 5,000 mg/kg

LD50 Oral - Rat - male - 3,523 mg/kg

LC50 Inhalation - Rat - 4 h - 4550 ppm

Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Other changes. Blood:Changes in cell count (unspecified).

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Moderate skin irritation - 4 h

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (p-Xylene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: ZE2625000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h
	LC50 - Carassius auratus (goldfish) - 18.00 mg/l - 24 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 35.50 - 63.10 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 3.20 - 4.40 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: 87.8 % - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307	Class: 3	Packing group: III
Proper shipping name: Xylenes		
Reportable Quantity (RQ): 100 lbs		

Poison Inhalation Hazard: No

IMDG

UN number: 1307	Class: 3	Packing group: III	EMS-No: F-E, S-D
Proper shipping name: XYLENES			

IATA

UN number: 1307	Class: 3	Packing group: III
Proper shipping name: Xylenes		

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
p-Xylene	106-42-3	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H332	Harmful if inhaled.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.9

Revision Date: 05/23/2016

Print Date: 06/21/2016



Material Safety Data Sheet

sec-Butylbenzene, 99+%

MSDS# 73785

Section 1 - Chemical Product and Company Identification

MSDS Name: sec-Butylbenzene, 99+%

Catalog Numbers: AC107860000, AC107860050, AC107860500, AC107861000, AC107862500, AC107865000

Synonyms: 2-Phenylbutane; Benzene, (1-methylpropyl)-; (1-Methylpropyl)benzene; Benzene, sec-butyl-

Company Identification: Acros Organics BVBA
Janssen Pharmaceuticaaan 3a
2440 Geel, Belgium

Company Identification: (USA) Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

For information in the US, call: 800-ACROS-01

For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99

Emergency Number US: 201-796-7100

CHEMTREC Phone Number, US: 800-424-9300

CHEMTREC Phone Number, Europe: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#: 135-98-8

Chemical Name: sec-Butylbenzene

%: 99+

EINECS#: 205-227-0

Hazard Symbols: XI



Risk Phrases: 10 36/37/38

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Flammable liquid and vapor. May cause central nervous system depression. Causes eye, skin, and respiratory tract irritation. Target Organs: Central nervous system.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation.

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion of large amounts may cause CNS depression.

Inhalation: Causes respiratory tract irritation.

Chronic: Prolonged or repeated skin contact may cause dermatitis.

Section 4 - First Aid Measures

Eyes:	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin:	Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion:	Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation:	Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:	Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:	As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor.
Extinguishing Media:	For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Use agent most appropriate to extinguish fire. Do NOT use straight streams of water.
Autoignition Temperature:	415 deg C (779.00 deg F)
Flash Point:	45 deg C (113.00 deg F)
Explosion Limits: Lower:	0.80 vol %
Explosion Limits: Upper:	6.90 vol %
NFPA Rating:	health: 2; flammability: 2; instability: 0;

Section 6 - Accidental Release Measures

General Information:	Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:	Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling:	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage:	Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
sec-Butylbenzene	none listed	none listed	none listed

OSHA Vacated PELs: sec-Butylbenzene: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Color: clear colorless

Odor: None reported.

pH: Not available

Vapor Pressure: 4 mm Hg @ 37.7 deg C

Vapor Density: 4.62

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: 173 - 174 deg C @ 760 mm Hg

Freezing/Melting Point: -75 deg C (-103.00°F)

Decomposition Temperature: Not available

Solubility in water: 0.015 g/L water

Specific Gravity/Density: 0.8630 g/cm³

Molecular Formula: C₁₀H₁₄

Molecular Weight: 134.22

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Ignition sources, excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 135-98-8: CY9100000

RTECS:

CAS# 135-98-8: Draize test, rabbit, eye: 500 mg/24H Mild;

Draize test, rabbit, skin: 100 mg/24H Moderate;

LD50/LC50: Oral, mouse: LD50 = 8700 mg/kg;

Oral, rat: LD50 = 2240 uL/kg;

Oral, rat: LD50 = 6300 mg/kg;

Skin, rabbit: LD50 = >16 mL/kg;

.

Carcinogenicity: sec-Butylbenzene - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: BUTYL BENZENES

Hazard Class: 3

UN Number: UN2709

Packing Group: III

Canada TDG

Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XI

Risk Phrases:

R 10 Flammable.

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 9 Keep container in a well-ventilated place.

S 16 Keep away from sources of ignition - No smoking.

S 33 Take precautionary measures against static discharges.

WGK (Water Danger/Protection)

CAS# 135-98-8: 1

Canada

CAS# 135-98-8 is listed on Canada's DSL List

Canadian WHMIS Classifications: B3, D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 135-98-8 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 135-98-8 is listed on the TSCA
Inventory.

Section 16 - Other Information

MSDS Creation Date: 9/02/1997

Revision #9 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

SAFETY DATA SHEET

Version 4.6
Revision Date 12/02/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Silver

Product Number : 327093
Brand : Aldrich

CAS-No. : 7440-22-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Ag
Molecular weight : 107.87 g/mol
CAS-No. : 7440-22-4
EC-No. : 231-131-3

Hazardous components

Component	Classification	Concentration
Silver		
		<= 100 %

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Silver/silver oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions

No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. Store under inert gas. Keep in a dry place.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters**

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Silver	7440-22-4	TWA	0.010000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.010000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Argyria		
		TWA	0.010000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.010000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.010000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Argyria		
		TWA	0.010000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Argyria		
		TWA	0.01 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

8.2 Exposure controls

Appropriate engineering controls

General industrial hygiene practice.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

No special environmental precautions required.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|---|
| a) Appearance | Form: powder |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 960 °C (1,760 °F) - lit. |
| f) Initial boiling point and boiling range | 2,212 °C (4,014 °F) - lit. |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 10.49 g/cm3 |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | No data available |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxygen, Strong acids and strong bases

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - > 5,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Carcinogenicity - Rat - Unreported

Tumorigenic: Tumors at site of application.

Carcinogenicity classification not possible from current data.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

May cause argyria (a slate-gray or bluish discoloration of the skin and deep tissues due to the deposit of insoluble albuminate of silver).

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Silver)

Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

Pennsylvania Right To Know Components

CAS-No.	Revision Date
---------	---------------

Silver

7440-22-4

1993-04-24

New Jersey Right To Know Components

Silver

CAS-No.
7440-22-4

Revision Date
1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6

Revision Date: 12/02/2015

Print Date: 02/09/2016

SAFETY DATA SHEET

Version 4.11
Revision Date 03/05/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Sodium

Product Number : 483745
Brand : Aldrich

CAS-No. : 7440-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260

Skin corrosion (Category 1B), H314

Serious eye damage (Category 1), H318

Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)
H260

In contact with water releases flammable gases which may ignite spontaneously.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H350 May cause cancer.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : Na
Molecular weight : 22.99 g/mol

Hazardous components

Component		Classification	Concentration
Sodium			
CAS-No.	7440-23-5	Water-react. 1; Skin Corr. 1B; Eye Dam. 1; H260, H314	>= 90 - <= 100 %
EC-No.	231-132-9		
Index-No.	011-001-00-0		
Paraffin oils			
CAS-No.	8012-95-1	Carc. 1A; H350	>= 90 - <= 100 %
EC-No.	232-384-2		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Dry powder

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

Handle and store under inert gas. Air sensitive.

Storage class (TRGS 510): Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Components with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
Paraffin oils	8012-95-1	STEL	10.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation 2014 Adoption Not classifiable as a human carcinogen		
		Upper Respiratory Tract irritation 2014 Adoption Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

- | | |
|---|--|
| a) Appearance | Form: Pieces |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 97.8 °C (208.0 °F) - lit. |
| f) Initial boiling point and boiling range | 883 °C (1,621 °F) - lit. |
| g) Flash point | 82 °C (180 °F) |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 0.97 g/cm3 |

- | | | |
|----|--|-------------------|
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | No data available |
| p) | Auto-ignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Air Do not allow water to enter container.
Exposure to moisture

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Paraffin oils)

NTP: Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Paraffin oils)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available
No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Aspiration may lead to:, lipid pneumonia, Effects due to ingestion may include:, laxative effect, Gastrointestinal disturbance, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1428 Class: 4.3
Proper shipping name: Sodium
Reportable Quantity (RQ): 10 lbs

Packing group: I

Poison Inhalation Hazard: No

IMDG

UN number: 1428 Class: 4.3

Packing group: I

EMS-No: F-G, S-N

Proper shipping name: SODIUM

IATA

UN number: 1428 Class: 4.3

Packing group: I

Proper shipping name: Sodium

IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
Paraffin oils	8012-95-1	1987-02-27

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.
Skin Corr.	Skin corrosion
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	3
Fire Hazard:	4
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.11

Revision Date: 03/05/2015

Print Date: 02/07/2016

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: TERT-BUTANOL

TRADE NAMES/SYNONYMS:

T-BUTANOL; 1,1-DIMETHYLETHANOL; TRIMETHYLCARBINOL; TRIMETHYLMETHANOL;
TRIMETHYL METHANOL; BUTYL ALCOHOL; 2-METHYL-2-PROPANOL; TERT-BUTYL
ALCOHOL; TRIMETHYL CARBINOL; UN 1120; C₄H₁₀O; 00230215; RTECS EO1925000

CHEMICAL FAMILY: aliphatic, alcohols

CREATION DATE: Dec 01 2003

REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TERT-BUTANOL
CAS NUMBER: 75-65-0
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0



EMERGENCY OVERVIEW:

CHANGE IN APPEARANCE: hygroscopic

COLOR: colorless

PHYSICAL FORM: crystals, liquid

ODOR: pungent odor

MAJOR HEALTH HAZARDS: respiratory tract irritation, eye irritation, central nervous system depression

PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: irritation, nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, loss of coordination, blurred vision

LONG TERM EXPOSURE: no information on significant adverse effects

SKIN CONTACT:

SHORT TERM EXPOSURE: irritation

LONG TERM EXPOSURE: irritation

EYE CONTACT:

SHORT TERM EXPOSURE: irritation, blurred vision

LONG TERM EXPOSURE: irritation

INGESTION:

SHORT TERM EXPOSURE: nausea, vomiting, diarrhea, stomach pain, headache, drowsiness, dizziness, loss of coordination, unconsciousness

LONG TERM EXPOSURE: no information on significant adverse effects

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive.

EXTINGUISHING MEDIA: alcohol-resistant foam, carbon dioxide, regular dry chemical, water

Large fires: Use alcohol-resistant foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Dike for later disposal. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. Withdraw immediately in case of rising sound from

venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

FLASH POINT: 52 F (11 C) (CC)

LOWER FLAMMABLE LIMIT: 2.4%

UPPER FLAMMABLE LIMIT: 8.0%

AUTOIGNITION: 892 F (478 C)

FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Remove sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

TERT-BUTANOL:

TERT-BUTYL ALCOHOL:

100 ppm (300 mg/m³) OSHA TWA

150 ppm (450 mg/m³) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)

100 ppm ACGIH TWA

100 ppm (300 mg/m³) NIOSH recommended TWA 10 hour(s)

150 ppm (450 mg/m³) NIOSH recommended STEL

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

1600 ppm

Any supplied-air respirator operated in a continuous-flow mode.

Any powered, air-purifying respirator with organic vapor cartridge(s).

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

Emergency or planned entry into unknown concentrations or IDLH conditions -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape -

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid

COLOR: colorless

CHANGE IN APPEARANCE: hygroscopic

PHYSICAL FORM: crystals, liquid

ODOR: pungent odor

MOLECULAR WEIGHT: 74.12

MOLECULAR FORMULA: (C-H₃)₃-C-O-H

BOILING POINT: 180 F (82 C)

MELTING POINT: 79 F (26 C)

VAPOR PRESSURE: 31 mmHg @ 20 C

VAPOR DENSITY (air=1): 2.6

SPECIFIC GRAVITY (water=1): 0.7887

WATER SOLUBILITY: soluble

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: 73 ppm

EVAPORATION RATE: 1.05 (butyl acetate=1)

VISCOSITY: 3.3 cP @ 30 C

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Soluble: alcohol, ether, acetone, benzene

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: metals, acids, oxidizing materials, combustible materials, metal salts

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TERT-BUTANOL:

IRRITATION DATA: 500 ul/24 hour(s) skin-rabbit mild; 100 ul/24 hour(s) eyes-rabbit severe

TOXICITY DATA: >10000 ppm/4 hour(s) inhalation-rat LC50; >2 gm/kg skin-rabbit LD50; 2743 mg/kg oral-rat LD50

CARCINOGEN STATUS: ACGIH: A4 -Not Classifiable as a Human Carcinogen

LOCAL EFFECTS:

Irritant: inhalation, eye

ACUTE TOXICITY LEVEL:

Moderately Toxic: ingestion

TARGET ORGANS: central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies

TUMORIGENIC DATA: Available.

MUTAGENIC DATA: Available.

REPRODUCTIVE EFFECTS DATA: Available.

ADDITIONAL DATA: Alcohol may enhance the toxic effects.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: 6410000 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (*Pimephales promelas*)

INVERTEBRATE TOXICITY: 5504000 ug/L 48 hour(s) EC50 (Immobilization) Water flea (Daphnia magna)

OTHER TOXICITY: 2450000 ug/L 48 hour(s) LC50 (Mortality) Clawed toad (Xenopus laevis)

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Butanols
ID NUMBER: UN1120
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3



CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Butanols
UN NUMBER: UN1120
CLASS: 3
PACKING GROUP/CATEGORY: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):

ACUTE: Yes

CHRONIC: No

FIRE: Yes

REACTIVE: No

SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
TERT-BUTYL ALCOHOL

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:

California Proposition 65: Not regulated.

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: Not determined.

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDL): Not determined.

16. OTHER INFORMATION

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SAFETY DATA SHEET

Version 3.5
Revision Date 11/04/2015
Print Date 02/22/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *tert*-Butylbenzene

Product Number : B90602
Brand : Aldrich

CAS-No. : 98-06-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.

P264	Wash skin thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: 2-Methyl-2-phenylpropane
Formula	: C ₁₀ H ₁₄
Molecular weight	: 134.22 g/mol
CAS-No.	: 98-06-6
EC-No.	: 202-632-4

Hazardous components

Component	Classification	Concentration
tert-Butylbenzene		
	Flam. Liq. 3; Eye Irrit. 2A; Aquatic Acute 2; Aquatic Chronic 2; H226, H319, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|---|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -58 °C (-72 °F) - lit. |
| f) Initial boiling point and boiling range | 169 °C (336 °F) - lit. |
| g) Flash point | 34.0 °C (93.2 °F) - closed cup |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower | Lower explosion limit: 0.8 %(V) |

flammability or
explosive limits

- | | |
|---|--|
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 0.867 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | log Pow: 3.80 |
| p) Auto-ignition temperature | 450.0 °C (842.0 °F) |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 3,045 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Tremor. Gastrointestinal:Changes in structure or function of salivary glands.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CY9120000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

- | | |
|---|--|
| Toxicity to fish | LC0 - Leuciscus idus (Golden orfe) - 44 mg/l - 48.0 h |
| | LC50 - Leuciscus idus (Golden orfe) - 65 mg/l - 48.0 h |
| Toxicity to daphnia and other aquatic invertebrates | LC50 - Daphnia magna (Water flea) - 41 mg/l - 24 h |

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant:yes

IATA

UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

tert-Butylbenzene	CAS-No. 98-06-6	Revision Date 1993-04-24
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New Jersey Right To Know Components

tert-Butylbenzene	CAS-No. 98-06-6	Revision Date 1993-04-24
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California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids

H226	Flammable liquid and vapour.
H319	Causes serious eye irritation.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.5

Revision Date: 11/04/2015

Print Date: 02/22/2016

Thallium



SAFETY DATA SHEET

1 PRODUCT AND SUPPLIER IDENTIFICATION

Product Name: Thallium Solid

Formula: TI

Supplier: ESPI Metals
1050 Benson Way
Ashland, OR 97520

Telephone: 800-638-2581

Fax: 541-488-8313

Email: sales@espimetals.com

Emergency: Infotrac 800-535-5053 (US) or 352-323-3500 (24 hour)

Recommended Uses: Scientific Research

2 HAZARDS IDENTIFICATION

GHS Classification (29 CFR 1910.1200): Acute toxicity - oral, category 2.

GHS Label Elements:



Signal Word: Danger

Hazard Statements: H300 Fatal if swallowed.

Precautionary Statements: P264 Wash hands thoroughly after handling, P270 Do not eat, drink or smoke when using this product, P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician, P330 Rinse mouth, P405 Store locked up, P501 Dispose of contents/container in accordance with local, state or federal regulations.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient: Thallium
CAS#: 7440-28-0
%: 100
EC#: 231-138-1

4 FIRST AID MEASURES

General Measures: Emergency responders should take care to avoid secondary exposure to thallium if it is present. Wear appropriate protective equipment.

INHALATION: Remove to fresh air, keep warm and quiet, give oxygen if breathing is difficult. Seek immediate medical attention. If mouth-to-mouth is necessary always use a barrier or bag-valve-mask device.

INGESTION: Rinse mouth with water. Do not induce vomiting. Seek immediate medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing, wash affected area with soap and water taking care not to break the skin and to cover all open wounds. Seek medical attention. Contaminated clothing should be safely contained and properly disposed of.

EYES: Flush eyes with lukewarm water, including under upper and lower eyelids, for at least 15 minutes. Seek medical attention immediately.

Most Important Symptoms/Effects, Acute and Delayed: Symptoms are usually delayed and include gastrointestinal distress and neurological symptoms. See section 11 for more information.

Indication of Immediate Medical Attention and Special Treatment: No other information available.

5 FIREFIGHTING MEASURES

Extinguishing Media: Use extinguishing media suitable for surrounding materials and type of fire.

Unsuitable Extinguishing Media: No further information available.

Specific Hazards Arising from the Material: Under fire conditions, thallium may release highly toxic fumes or gases.

Special Protective Equipment and Precautions for Firefighters: Full face, self-contained breathing apparatus and full protective clothing.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures: Wear appropriate respiratory and protective equipment specified in section 8. Isolate spill area and provide ventilation. Avoid breathing dust or fume. Avoid contact with skin and eyes. Eliminate all sources of ignition.

Methods and Materials for Containment and Cleaning Up: Scoop up or vacuum with a system utilizing a HEPA filtration system and place in properly labeled sealed containers. Special precautions must be taken when changing filters on HEPA vacuum cleaners used to clean up hazardous materials. Avoid creating dusts. Avoid contamination of air and water.

Environmental Precautions: Do not allow to enter drains or to be released to the environment.

7 HANDLING AND STORAGE

Precautions for Safe Handling: Wear appropriate respiratory and protective equipment specified in section 8. Only trained personnel should work with this product. Handle in a well-ventilated area. Avoid exposure to high temperature. Avoid breathing fumes. Avoid contact with skin and eyes. Wash thoroughly before eating or smoking.

Conditions for Safe Storage, Including Any Incompatibilities: Store under dry, inert gas such as argon, or can also be stored under deaerated water. Store in sealed unbreakable containers; the original labeled shipping container when possible. Store in an area that is cool, dry and temperature-controlled, away from direct sunlight, heat and ignition sources or where freezing is possible. Do not store together with acids, halogens or oxidizers. See section 10 for more information on incompatible materials.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Thallium (Soluble compounds, as TI)

OSHA/PEL: 0.1 mg/m³

ACGIH/TLV: 0.02 mg/m³(inhalable)

Appropriate Engineering Controls: Handle in an enclosed, controlled process under dry argon. Whenever possible the use of local exhaust ventilation, process enclosure or other engineering controls is the preferred method of controlling exposure to meet established occupational exposure limits. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Clothing worn in areas of exposure to thallium dust or vapor should be restricted to the workplace and stored in special lockers.

Individual Protection Measures, Such as Personal Protective Equipment:

Respiratory Protection: When potential exposures are above the occupational limits, approved respirators must be used.

Eye Protection: Splash goggles or safety glasses.

Skin Protection: Wear impermeable gloves, protective work clothing as necessary.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Form: Rod

Color: Gray metallic

Odor: Odorless

Odor Threshold: Not determined

pH: N/A

Melting Point: 303.5 °C

Boiling Point: 1457±10 °C

Flash Point: N/A

Evaporation Rate: N/A

Flammability: No data

Upper Flammable Limit: No data

Lower Flammable Limit: No data

Vapor Pressure: 1 mm Hg @ 825 °C

Vapor Density: N/A

Relative Density (Specific Gravity): 11.85 g/cc

Solubility in H₂O: Insoluble

Partition Coefficient (n-octanol/water): Not determined

Autoignition Temperature: No data

Decomposition Temperature: No data

Viscosity: N/A

10 STABILITY AND REACTIVITY

Reactivity: No data

Chemical Stability: Stable under recommended storage conditions.

Possibility of Hazardous Reactions: High temperatures will generate toxic thallium oxide fumes.

Conditions to Avoid: Avoid high temperatures, reacts slowly with moist air.

Incompatible Materials: Oxidizing agents, strong acids, halogens, air and moisture.

Hazardous Decomposition Products: Thallium oxide fume.

11 TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, skin and eyes.

Symptoms of Exposure: Abdominal pain and vomiting, extreme pain in the extremities, lethargy, hair loss.

Acute and Chronic Effects: Almost all of the available information refers to ingestion of thallium compounds, largely due to accidental ingestion, intentional poisoning and suicide attempts. Adverse reactions are dose dependent and occur in 3 stages. Massive doses may cause gastrointestinal distress (nausea, vomiting and abdominal pain) within 30 minutes but symptoms are usually delayed for 8 hours or longer. Gastrointestinal symptoms from smaller doses may

be delayed 24-48 hours. This is followed by neurological effects 2-5 days or even longer after ingestion, although it may occur as early as 12 hours after massive exposure. Other effects include hair loss, severe pain in the extremities, lethargy, ataxia, back pain, abnormal reflexes, neuropathy, muscle weakness, mental abnormalities, tremors, abnormal vision, headache, coma, convulsion, and death. There was no information available for exposure to thallium metal specifically rather than thallium compounds, and little conclusive information regarding exposure via inhalation.

Acute Toxicity: No data

Carcinogenicity: **NTP:** Not identified as carcinogenic **IARC:** Not identified as carcinogenic

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12 ECOLOGICAL INFORMATION

Ecotoxicity: LC50 - Cyprinodon variegatus (sheepshead minnow) - 21.0 mg/l - 96.0 h

Persistence and Degradability: No data

Bioaccumulative Potential: No data

Mobility in Soil: No data

Other Adverse Effects: Do not allow material to be released to the environment. No further relevant information available.

13 DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Product: Dispose of in accordance with Federal, State and Local regulations.

Packaging: Dispose of in accordance with Federal, State and Local regulations.

14 TRANSPORT INFORMATION

UN Number: UN3288

UN Proper Shipping Name: Toxic solid, inorganic, n.o.s. (Thallium)

Transport Hazard Class: 6.1

Packing Group: II

Marine Pollutant: Yes

15 REGULATORY INFORMATION

TSCA Listed: All components are listed.

Regulation (EC) No 1272/2008 (CLP): Acute toxicity - oral, category 2, Hazardous to the aquatic environment - acute hazard, category 3, Hazardous to the aquatic environment - chronic hazard, category 3.

Canada WHMIS Classification (CPR, SOR/88-66): Acute toxicity.

HMIS Ratings: Health: 3 Flammability: 0 Physical: 0

NFPA Ratings: Health: 3 Flammability: 0 Instability: 0

Chemical Safety Assessment: A chemical safety assessment has not been carried out.

16 OTHER INFORMATION

The information contained in this document is based on the state of our knowledge at the time of publication and is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI Metals makes no representation, warranty, or guarantee of any kind with respect to the information contained in this document or any use of the product based on this information. ESPI Metals shall not be held liable for any damages resulting from handling or from contact with the above product. Users should satisfy themselves that they have all current data relevant to their particular use.

Prepared by: ESPI Metals

Revised/Reviewed: July 2015

SAFETY DATA SHEET

Version 5.5
Revision Date 08/14/2014
Print Date 04/13/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : trans-Chlordane

Product Number : PS752

Brand : Supelco

CAS-No. : 5103-74-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302

Harmful if swallowed.

H351

Suspected of causing cancer.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P273

Avoid release to the environment.

P281

Use personal protective equipment as required.

P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P330	Rinse mouth.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight	: 409.76 g/mol
CAS-No.	: 5103-74-2
EC-No.	: 225-826-0

Hazardous components

Component	Classification	Concentration
trans-Chlordane		
	Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H351, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: crystalline Colour: white
b) Odour	odourless
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	1.590 g/cm ³
n) Water solubility	insoluble
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Mouse - 275 mg/kg

LD50 Oral - Rat - 1,100 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (trans-Chlordane)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - *Lepomis macrochirus* - 0.05 mg/l - 96 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (trans-Chlordane)
Reportable Quantity (RQ):
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (trans-Chlordane)
Marine pollutant: Marine pollutant

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (trans-Chlordane)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
trans-Chlordane	5103-74-2	

New Jersey Right To Know Components

	CAS-No.	Revision Date
trans-Chlordane	5103-74-2	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5

Revision Date: 08/14/2014

Print Date: 04/13/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichloroethylene

Product Number : 251402
Brand : Sigma-Aldrich
Index-No. : 602-027-00-9

CAS-No. : 79-01-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: TCE Trichloroethene
Formula	: C ₂ HCl ₃
Molecular weight	: 131.39 g/mol
CAS-No.	: 79-01-6
EC-No.	: 201-167-4
Index-No.	: 602-027-00-9

Hazardous components

Component	Classification	Concentration
Trichloroethylene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H315, H319, H336, H341, H350, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive. Handle and store under inert gas.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Components with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
Trichloroethylene	79-01-6	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		STEL	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		Potential Occupational Carcinogen See Appendix C See Appendix A		
		See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Trichloroethylene	79-01-6	Trichloroacetic acid	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Trichloroethanol	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|--|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: -84.8 °C (-120.6 °F) - lit. |
| f) Initial boiling point and boiling range | 86.7 °C (188.1 °F) - lit. |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower | Upper explosion limit: 10.5 %(V) |

flammability or
explosive limits Lower explosion limit: 8 %(V)

- | | | |
|----|--|---|
| k) | Vapour pressure | 81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F) |
| l) | Vapour density | No data available |
| m) | Relative density | 1.463 g/mL at 25 °C (77 °F) |
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | log Pow: 2.29log Pow: 5 |
| p) | Auto-ignition temperature | 410.0 °C (770.0 °F) |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents, Strong bases, Magnesium

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 4,920 mg/kg

LC50 Inhalation - Mouse - 4 h - 8450 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation - 24 h

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Trichloroethylene)

NTP: Reasonably anticipated to be a human carcinogen (Trichloroethylene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: KX4550000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h

LOEC - other fish - 11 mg/l - 10.0 d

NOEC - Oryzias latipes - 40 mg/l - 10.0 d

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h

Toxicity to algae IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1710 Class: 6.1 Packing group: III

Proper shipping name: Trichloroethylene

Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1710 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: TRICHLOROETHYLENE

IATA

UN number: 1710 Class: 6.1 Packing group: III

Proper shipping name: Trichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2011-09-01

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

	CAS-No.	Revision Date
	79-01-6	2011-09-01

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6

Revision Date: 03/02/2015

Print Date: 02/18/2016

SAFETY DATA SHEET

Version 4.17
Revision Date 03/03/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Trichlorofluoromethane

Product Number : 254991

Brand : Aldrich

CAS-No. : 75-69-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Dermal (Category 4), H312

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Warning

Hazard statement(s)

H312 : Harmful in contact with skin.

Precautionary statement(s)

P280 : Wear protective gloves/ protective clothing.
P302 + P352 + P312 : IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P363 : Wash contaminated clothing before reuse.
P501 : Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS**3.1 Substances**

Synonyms : Fluorotrichloromethane
CFC-11

Formula : CCl₃F CCl₃F
Molecular weight : 137.37 g/mol
CAS-No. : 75-69-4
EC-No. : 200-892-3

Hazardous components

Component	Classification	Concentration
Trichlorofluoromethane		
	Acute Tox. 4; H312	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas, Hydrogen fluoride

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Contents under pressure.

Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichlorofluoromethane	75-69-4	C	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Cardiac sensitization Not classifiable as a human carcinogen		
		C	1,000.000000 ppm 5,600.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1,000.000000 ppm 5,600.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 30 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|---|
| a) Appearance | Form: liquid, clear
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | -110.99 - -109.99 °C (-167.78 - -165.98 °F) |
| f) Initial boiling point and boiling range | 23.7 °C (74.7 °F) - lit. |
| g) Flash point | No data available |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | 885.7 hPa (664.3 mmHg) at 20.0 °C (68.0 °F)
2,701.2 hPa (2,026.1 mmHg) at 55.0 °C (131.0 °F) |
| l) Vapour density | No data available |
| m) Relative density | 1.494 g/cm ³ at 25 °C (77 °F) |
| n) Water solubility | 1 g/l |
| o) Partition coefficient: n-octanol/water | log Pow: 2.53 |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 18.0 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Sodium/sodium oxides, Potassium, Magnesium, Aluminum, Zinc

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - > 15,000 mg/kg

LC50 Inhalation - Rat - 0.3 h - 130000 ppm

Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: PB6125000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated., Nausea, Dizziness, Headache, Vomiting, Diarrhoea, Abdominal pain, Weakness, Unconsciousness

Liver -

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 3082

Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Trichlorofluoromethane)

Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

Trichlorofluoromethane	CAS-No. 75-69-4	Revision Date 2007-07-01
------------------------	--------------------	-----------------------------

Pennsylvania Right To Know Components

Trichlorofluoromethane	CAS-No. 75-69-4	Revision Date 2007-07-01
------------------------	--------------------	-----------------------------

New Jersey Right To Know Components

Trichlorofluoromethane	CAS-No. 75-69-4	Revision Date 2007-07-01
------------------------	--------------------	-----------------------------

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H312	Harmful in contact with skin.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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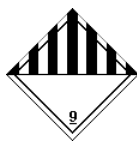
Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.17

Revision Date: 03/03/2015

Print Date: 02/18/2016



HEALTH	*	3
FLAMMABILITY		0
PHYSICAL HAZ.		0
PPE		X



Printed: 12/03/2010
Revision: 12/03/2010
Supersedes Revision: 11/02/2010
Date Created: 07/13/2009

1. Product and Company Identification

Product Code: 3007
Product Name: SIFCO Process Trivalent Chromium Conversion
Manufacturer Information
Company Name: SIFCO Applied Surface Concepts
 Division of SIFCO Industries, Inc.
 5708 E. Schaaf Road
 Independence, OH 44131
Phone Number: (216)524-0099
Fax Number: (216)524-6331
Emergency Contact: CHEMTREC (United States) (800)424-9300
Information: CHEMTREC (International-Collect) +1 (703)527-3887
Web site address: <http://www.SIFCOASC.com>
Email address: info@sifcoasc.com

2. Hazards Identification

Emergency Overview

Blue liquid with no characteristic odor.

Caution! May cause eye and skin burns. May be harmful if swallowed.

Contains materials that can cause target organ damage. Contains materials which can cause cancer. Emergency Response Guide #171

Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes

Health Hazards (Acute and Chronic)

INHALATION: May give off gas, vapor or dust that is irritating to the respiratory system. Exposure to decomposition products may cause a health hazard.

INGESTION: Harmful if swallowed. May cause burns to mouth, throat and stomach.

EYE: May be corrosive to eyes. May cause burns.

SKIN CONTACT: May be corrosive to the skin. May cause burns.

CHRONIC EFFECTS: Contains material that may cause target organ damage.

Signs and Symptoms Of Exposure

Dependant on route(s) of entry. See section above for details.

3. Composition/Information on Ingredients

Hazardous Components (Chemical Name)	CAS #	Concentration	Formula	RTECS #
1. Sodium nitrate	7631-99-4	1.0 -3.0 %	NaNO3	WC5600000
2. Chromium hydroxide sulphate (Cr(OH)(SO4))	12336-95-7	1.0 -3.0 %	CrHO5S	GB6240000
3. Cobalt sulfate heptahydrate	10026-24-1	0.3 -1.0 %	CoSO4.7H2O	GG3200000
4. Ammonium bifluoride	1341-49-7	0.3 -1.0 %	F2H5N	BQ9200000
5. Water	7732-18-5	92.0 -97.4 %	H2O	ZC0110000

4. First Aid Measures

Emergency and First Aid Procedures

First aid providers must take proper precautions for their own safety before entering contaminated areas to assist chemical accident victims and handling their contaminated clothing and equipment. Another person should immediately call the Emergency Medical Service, 911-Operator, Hospital, Physician, Ophthalmologist or Poison Control Center, as applicable. Give the following information: Location of the accident, your phone number, description of the accident, name of chemical agent and product, number and condition of casualties, what is

being done for the victims.

Stay on the phone until the other party hangs up! Remove victim from contaminated area to a clean, quiet, ventilated area. Keep them calm and warm.

EYES: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes.

SKIN: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Thoroughly decontaminate (or discard) clothing and shoes.

INHALATION: Remove to fresh air. Lay victim down, legs raised. Loosen tight clothing, cover with a blanket. If not breathing, give artificial respiration.

INGESTION: DO NOT induce vomiting, unless advised by EMS. Give large quantities of water. Never give anything by mouth to an unconscious person.

5. Fire Fighting Measures

Flammability Classification: Material will not burn

Flash Pt:

Explosive Limits: LEL: UEL:

Special Fire Fighting Procedures

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Unusual Fire and Explosion Hazards

Suitable Extinguishing Media

Use an extinguishing agent suitable for the surrounding fire.

Unsuitable Extinguishing Media

None known.

6. Accidental Release Measures

Steps To Be Taken In Case Material Is Released Or Spilled

Do not touch or walk through spilled material. Isolate hazard area and keep people away. Notify your facility emergency coordinator. Eliminate all sources of ignition. Provide maximum ventilation. Do not release into soil, sewers, or natural bodies of water. Wear proper personal protective equipment (PPE). Carefully mop up or vacuum spill and triple rinse with water into suitable plastic container. Release of a reportable quantity (RQ) requires notification of proper authorities. Dispose of according to local, state, and federal regulations.

7. Handling and Storage

Precautions To Be Taken in Handling

Put on appropriate personal protective equipment. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking.

Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Precautions To Be Taken in Storing

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure Controls/Personal Protection

Hazardous Components (Chemical Name)	CAS #	OSHA PEL	ACGIH TLV	Other Limits
1. Sodium nitrate	7631-99-4		10 mg/m3	
2. Chromium hydroxide sulphate (Cr(OH)(SO4))	12336-95-7			
3. Cobalt sulfate heptahydrate	10026-24-1			
4. Ammonium bifluoride	1341-49-7			
5. Water	7732-18-5			

Respiratory Equipment (Specify Type)

If engineering controls are not feasible, the respiratory protection program must comply with OSHA 29 CFR 1910.134

Eye Protection

Face shield and safety glasses w/side shields or splash-proof chemical goggles. Do not wear contact lenses. Eye wash station, safety shower, washing facilities near work area.

Protective Gloves

Nitrile gloves.

Ventilation

If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Work/Hygienic/Maintenance Practices

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9. Physical and Chemical Properties

Physical States:	[] Gas	[X] Liquid	[] Solid
Explosive Limits:	LEL:		UEL:
Specific Gravity (Water = 1):	1.045 - 1.050		
Density:	1.03 - 1.07		
pH:	2.0 - 2.5		
Appearance and Odor			

Blue liquid with no characteristic odor.

10. Stability and Reactivity

Stability:	Unstable []	Stable [X]
Conditions To Avoid - Instability		
Incompatibility - Materials To Avoid		
Hazardous Decomposition Or Byproducts		
Possibility of Hazardous Reactions:	Will occur []	Will not occur [X]
Conditions To Avoid - Hazardous Reactions		

Avoid exposure - obtain special instructions before use.

11. Toxicological Information

Inhalation : May give off gas, vapor or dust that is irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard.

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.

Skin : May be corrosive to the skin. May cause burns.

Eyes : May be corrosive to eyes. May cause burns.

Carcinogenicity/Other Information

Hazardous Components (Chemical Name)	CAS #	NTP	IARC	ACGIH	OSHA
1. Sodium nitrate	7631-99-4				
2. Chromium hydroxide sulphate (Cr(OH)(SO ₄))	12336-95-7				
3. Cobalt sulfate heptahydrate	10026-24-1		2B	A3	
4. Ammonium bifluoride	1341-49-7				
5. Water	7732-18-5				

Carcinogenicity: NTP? Unknown IARC Monographs? Unknown OSHA Regulated?
Unknown

12. Ecological Information

No known significant effects or critical hazards.

13. Disposal Considerations

Waste Disposal Method

Ship to approved treatment/disposal facility. Dispose of according to local, state, and federal regulations. Follow the applicable regulations for disposal of empty containers and rinsate. The disposal information applies to the material as manufactured. Contamination may affect the disposal requirements. The responsibility for proper waste disposal is with the generator of the waste.

14. Transport Information

LAND TRANSPORT (US DOT)

DOT Proper Shipping Name UN3082, Environmentally hazardous substances, liquid, n.o.s.
(Chromium Sulphate) PG III - ERG 171

DOT Hazard Class: 9

DOT Hazard Label: CLASS 9

UN/NA Number: UN3082

Packing Group: III

LAND TRANSPORT (Canadian TDG)

UN Number: 3082

Packing Group: III

LAND TRANSPORT (European ADR/RID)

UN Number: 3082

Packing Group: III

AIR TRANSPORT (ICAO/IATA)

UN Number: 3082

Packing Group: III

IATA Classification: 9

MARINE TRANSPORT (IMDG/IMO)

UN Number: 3082

Packing Group: III

Marine Pollutant: No

15. Regulatory Information

US EPA SARA Title III

Hazardous Components (Chemical Name)	CAS #	Sec.302 (EHS)	Sec.304 RQ	Sec.313 (TRI)	Sec.110
1. Sodium nitrate	7631-99-4	No	No	Yes-Cat. N511	No
2. Chromium hydroxide sulphate (Cr(OH)(SO ₄))	12336-95-7	No	No	Yes-Cat. N090	No
3. Cobalt sulfate heptahydrate	10026-24-1	No	No	No	No
4. Ammonium bifluoride	1341-49-7	No	Yes 100 LB	No	No

Hazardous Components (Chemical Name)

5. Water

CAS #

7732-18-5

Sec.302 (EHS)

No

Sec.304 RQ

No

Sec.313 (TRI)

No

Sec.110

No

US EPA CAA, CWA, TSCA

Hazardous Components (Chemical Name)

1. Sodium nitrate

CAS #

7631-99-4

EPA CAA

HAP, ODC ()

EPA CWA NPDES

No

EPA TSCA

Inventory, 8A CAIR

CA PROP 65

No

2. Chromium hydroxide sulphate (Cr(OH)(SO₄))

12336-95-7

HAP, ODC ()

No

Inventory

No

3. Cobalt sulfate heptahydrate

10026-24-1

HAP, ODC ()

No

No

Yes

4. Ammonium bifluoride

1341-49-7

HAP, ODC ()

No

Inventory

No

5. Water

7732-18-5

HAP, ODC ()

No

Inventory

No

**SARA (Superfund Amendments and
Reauthorization Act of 1986) Lists:**

Sec.302:

EPA SARA Title III Section 302 Extremely Hazardous Chemical with TPQ. * indicates 10000 LB TPQ if not volatile.

Sec.304:

EPA SARA Title III Section 304: CERCLA Reportable + Sec.302 with Reportable Quantity. ** indicates statutory RQ.

Sec.313:

EPA SARA Title III Section 313 Toxic Release Inventory. Note: -Cat indicates a member of a chemical category.

Sec.110:

EPA SARA 110 Superfund Site Priority Contaminant List

**TSCA (Toxic Substances Control
Act) Lists:**

Inventory:

Chemical Listed in the TSCA Inventory.

5A(2):

Chemical Subject to Significant New Rules (SNURS)

6A:

Commercial Chemical Control Rules

8A:

Toxic Substances Subject To Information Rules on Production

8A CAIR:

Comprehensive Assessment Information Rules - (CAIR)

8A PAIR:

Preliminary Assessment Information Rules - (PAIR)

8C:

Records of Allegations of Significant Adverse Reactions

8D:

Health and Safety Data Reporting Rules

8D TERM:

Health and Safety Data Reporting Rule Terminations

12(b):

Notice of Export

Other Important Lists:

CWA NPDES:

EPA Clean Water Act NPDES Permit Chemical

CAA HAP:

EPA Clean Air Act Hazardous Air Pollutant

CAA ODC:

EPA Clean Air Act Ozone Depleting Chemical (1=CFC, 2=HCFC)

CA PROP 65:

California Proposition 65

International Regulatory Lists:

EPA Hazard Categories:

This material meets the EPA 'Hazard Categories' defined for SARA Title III Sections 311/312 as indicated:

☒ Yes ☐ No Acute (immediate) Health Hazard

☒ Yes ☐ No Chronic (delayed) Health Hazard

☐ Yes ☒ No Fire Hazard

☐ Yes ☒ No Sudden Release of Pressure Hazard

☐ Yes ☒ No Reactive Hazard

Regulatory Information

U.S. FEDERAL REGULATIONS:

1. Supplier Notification about toxic Chemicals.

SIFCO Applied Surface Concepts is required to inform you, that this product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372, if specified annual thresholds are met or exceeded.

Toxic Chemical	CAS #	Wt.% (Maximum)
Chromium Sulphate	- 12336-95-7	- 3%

Your other suppliers of trade name products or mixtures containing section 313 chemicals must also notify you. If you repackage or otherwise redistribute this product to industrial customers you are required to furnish similar notification to them.

2. CERCLA and EPCRA:

Threshold Planning Quantity: N/A
(Release) Reportable Quantity: N/A
Extremely Hazardous Substance: None

3. EPCRA Hazard Categories:

Immediate (Acute) Health: Yes
Delayed (Chronic) Health: Yes
Fire: No
Sudden release of Pressure: No
Reactivity: No

4. TSCA Statement.

All ingredients of this product are listed under the Toxic Substances Control Act (TSCA).

5. ODS Certification.

This product does not contain and is not manufactured with Ozone Depleting Substances (ODS).

6. VOC Certification.

This product does not contain any Volatile Organic Compounds (VOC).

7. PCB Certification.

This product does not contain any polychlorinated biphenyls (PCB).

STATE REGULATIONS:

California Prop. 65:

WARNING! This product contains chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm.

INTERNATIONAL REGULATIONS:

WHMIS Classification.

Class D-2B

16. Other Information

Company Policy or Disclaimer

DISCLAIMER:

This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

SAFETY DATA SHEET

Version 5.8
Revision Date 03/13/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Vanadium(V) oxide

Product Number : 204854
Brand : Aldrich
Index-No. : 023-001-00-8

CAS-No. : 1314-62-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Serious eye damage (Category 1), H318
Germ cell mutagenicity (Category 2), H341
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H302 + H332 Harmful if swallowed or if inhaled
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H341 Suspected of causing genetic defects.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.

H411	Toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: O ₅ V ₂
Molecular weight	: 181.88 g/mol
CAS-No.	: 1314-62-1
EC-No.	: 215-239-8
Index-No.	: 023-001-00-8

Hazardous components

Component	Classification	Concentration
Vanadium pentoxide		
	Acute Tox. 4; Eye Dam. 1; Muta. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 2; Aquatic Chronic 2; H302 + H332, H318, H335, H341, H361, H372, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Vanadium/vanadium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters**

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vanadium pentoxide	1314-62-1	C	0.100000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		C	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	0.050000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Lower Respiratory Tract irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Lower Respiratory Tract irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.100000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Vanadium pentoxide	1314-62-1	Vanadium	0.0500 mg/g	In urine	
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|--|---|
| a) Appearance | Form: solid |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 690 °C (1,274 °F) - lit. |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | Not applicable |

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	3.35 g/mL at 25 °C (77 °F)
n)	Water solubility	904 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information

Solubility in other solvents	Ethanol - insoluble
------------------------------	---------------------

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong acids

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Harmful if swallowed. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

LC50 Inhalation - Rat - female - 4 h - 2.21 mg/l
(OECD Test Guideline 403)

LC50 Dermal - Rat - > 2,500 mg/kg
(OECD Test Guideline 402)

No data available

Skin corrosion/irritation

Skin - in vitro assay

Result: No skin irritation

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Risk of serious damage to eyes.

(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

In vitro tests showed mutagenic effects

Carcinogenicity

No data available

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Vanadium pentoxide)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Possible risk of congenital malformation in the fetus.

Suspected human reproductive toxicant

No data available

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - *Oncorhynchus mykiss* (rainbow trout) - 5.2 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates LC50 - *Daphnia magna* (Water flea) - 1.52 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Toxic to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2862 Class: 6.1 Packing group: III

Proper shipping name: Vanadium pentoxide

Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2862 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: VANADIUM PENTOXIDE

Marine pollutant: yes

IATA

UN number: 2862 Class: 6.1 Packing group: III

Proper shipping name: Vanadium pentoxide

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

SARA 313 Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

New Jersey Right To Know Components

Vanadium pentoxide

CAS-No.
1314-62-1

Revision Date
2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

Vanadium pentoxide

CAS-No.
1314-62-1

Revision Date
2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

Copyright 2015 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8

Revision Date: 03/13/2015

Print Date: 01/29/2016

Safety Data Sheet

acc. to OSHA HCS

Printing date 03/28/2019

Version Number 4

Reviewed on 03/23/2019

1 Identification

- **Product identifier**
- **Trade name:** VOC Gas Standard (1X1 mL)
- **Part number:** DWM-544-1
- **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA
- **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
- **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.



GHS08 Health hazard

Carc. 1A H350 May cause cancer.

STOT SE 1 H370 Causes damage to organs.

- **Label elements**
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS02



GHS06



GHS08

- **Signal word** Danger
- **Hazard-determining components of labeling:**
methanol
vinyl chloride
bromomethane
- **Hazard statements**
Highly flammable liquid and vapor.

(Contd. on page 2)



Safety Data Sheet

acc. to OSHA HCS

Printing date 03/28/2019

Version Number 4

Reviewed on 03/23/2019

Trade name: VOC Gas Standard (1X1 mL)

(Contd. of page 1)

Toxic if inhaled.

May cause cancer.

Causes damage to organs.

Precautionary statements

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Do not breathe dust/fume/gas/mist/vapors/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

IF exposed or concerned: Get medical advice/attention.

Specific treatment (see on this label).

In case of fire: Use for extinction: CO₂, powder or water spray.

Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)



Health = 1

Fire = 3

Reactivity = 0

HMIS-ratings (scale 0 - 4)



Health = *1

Fire = 3

Reactivity = 0

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:

67-56-1	methanol	98.483%
74-87-3	chloromethane	0.253%
75-01-4	vinyl chloride	0.253%

(Contd. on page 3)

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75-00-3 chloroethane

0.253%

4 First-aid measures

- **Description of first aid measures**
- **General information:**
Immediately remove any clothing soiled by the product.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
- **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**

· PAC-1:

67-56-1 methanol

530 ppm

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74-87-3	chloromethane	150 ppm
74-83-9	bromomethane	19 ppm
75-01-4	vinyl chloride	250 ppm
75-71-8	dichlorodifluoromethane	3,000 ppm
75-69-4	trichlorofluoromethane	91 ppm
75-00-3	chloroethane	300 ppm
· PAC-2:		
67-56-1	methanol	2,100 ppm
74-87-3	chloromethane	910 ppm
74-83-9	bromomethane	210 ppm
75-01-4	vinyl chloride	1,200 ppm
75-71-8	dichlorodifluoromethane	10,000 ppm
75-69-4	trichlorofluoromethane	1,000 ppm
75-00-3	chloroethane	5100* ppm
· PAC-3:		
67-56-1	methanol	7200* ppm
74-87-3	chloromethane	3,000 ppm
74-83-9	bromomethane	740 ppm
75-01-4	vinyl chloride	4800* ppm
75-71-8	dichlorodifluoromethane	50,000 ppm
75-69-4	trichlorofluoromethane	10,000 ppm
75-00-3	chloroethane	20000** ppm

7 Handling and storage

· Handling:

· Precautions for safe handling

Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.

· Information about protection against explosions and fires:

Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.

· Conditions for safe storage, including any incompatibilities

· Storage:

· **Requirements to be met by storerooms and receptacles:** Store in a cool location.

· **Information about storage in one common storage facility:** Not required.

· Further information about storage conditions:

Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.

· **Specific end use(s)** No further relevant information available.

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8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**

67-56-1 methanol

PEL	Long-term value: 260 mg/m ³ , 200 ppm
REL	Short-term value: 325 mg/m ³ , 250 ppm Long-term value: 260 mg/m ³ , 200 ppm Skin
TLV	Short-term value: 328 mg/m ³ , 250 ppm Long-term value: 262 mg/m ³ , 200 ppm Skin; BEI

74-87-3 chloromethane

PEL	Long-term value: 100 ppm Ceiling limit value: 200; 300* ppm *5-min peak in any 3 hrs
REL	See Pocket Guide App. A
TLV	Short-term value: 207 mg/m ³ , 100 ppm Long-term value: 103 mg/m ³ , 50 ppm Skin

75-01-4 vinyl chloride

PEL	Short-term value: 5* ppm Long-term value: 1 ppm *Avg. not exceeding any 15 min; see 29CFR1910.1017
REL	See Pocket Guide App.A
TLV	Long-term value: 2.6 mg/m ³ , 1 ppm

75-00-3 chloroethane

PEL	Long-term value: 2600 mg/m ³ , 1000 ppm
REL	Handle with caution; See Pocket Guide App. C
TLV	Long-term value: 264 mg/m ³ , 100 ppm Skin

· **Ingredients with biological limit values:**

67-56-1 methanol

BEI	15 mg/L Medium: urine Time: end of shift Parameter: Methanol (background, nonspecific)
-----	---

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

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Store protective clothing separately.

Breathing equipment:

When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.

Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.

Protection of hands:

Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.

Material of gloves

For normal use: nitrile rubber, 11-13 mil thickness

For direct contact with the chemical: butyl rubber, 12-15 mil thickness

Penetration time of glove material

For normal use: nitrile rubber: 1 hour

For direct contact with the chemical: butyl rubber: >4 hours

Eye protection:


Tightly sealed goggles

9 Physical and chemical properties

Information on basic physical and chemical properties
General Information
Appearance:

Form: Fluid

Color: Colorless

Odor: Alcohol-like

Odor threshold: Not determined.

pH-value: Not determined.

Change in condition

Melting point/Melting range: -98 °C (-144.4 °F)

Boiling point/Boiling range: 64.7 °C (148.5 °F)

Flash point: 9 °C (48.2 °F)

Flammability (solid, gaseous): Not applicable.

Ignition temperature: 455 °C (851 °F)

Decomposition temperature: Not determined.

Auto igniting: Product is not selfigniting.

Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

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· Explosion limits:	
Lower:	5.5 Vol %
Upper:	44 Vol %
· Vapor pressure at 20 °C (68 °F):	100 hPa (75 mm Hg)
· Density at 20 °C (68 °F):	0.80692 g/cm ³ (6.73375 lbs/gal)
· Relative density	Not determined.
· Vapor density	Not determined.
· Evaporation rate	Not determined.
· Solubility in / Miscibility with Water:	Not miscible or difficult to mix.
· Partition coefficient (n-octanol/water):	Not determined.
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· Solvent content:	
Organic solvents:	98.7 %
VOC content:	98.48 %
	794.7 g/l / 6.63 lb/gal
Solids content:	0.0 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**
ATE (Acute Toxicity Estimate)

Oral	LD50	84,652 mg/kg (rat)
Inhalative	LC50/4 h	3.05 mg/L

67-56-1 methanol

Oral	LD50	5,628 mg/kg (rat)
Dermal	LD50	15,800 mg/kg (rabbit)

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Trade name: VOC Gas Standard (1X1 mL)

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74-87-3 chloromethane

Oral	LD50	1,800 mg/kg (rat)
Inhalative	LC50/4 h	>21,800 mg/L (rat)

74-83-9 bromomethane

Oral	LD50	214 mg/kg (rat)
Inhalative	LC50/4 h	302 mg/L (rat)

75-01-4 vinyl chloride

Oral	LD50	500 mg/kg (rat)
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75-69-4 trichlorofluoromethane

Oral	LD50	>15,000 mg/kg (rat)
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75-00-3 chloroethane

Inhalative	LC50/4 h	>19,000 mg/L (rat)
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· Primary irritant effect:
· on the skin: No irritant effect.

· on the eye: No irritating effect.

· Sensitization: No sensitizing effects known.

· Additional toxicological information:

The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic

· Carcinogenic categories
· IARC (International Agency for Research on Cancer)

74-87-3	chloromethane	3
74-83-9	bromomethane	3
75-01-4	vinyl chloride	1
75-00-3	chloroethane	3

· NTP (National Toxicology Program)

75-01-4	vinyl chloride	K
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· OSHA-Ca (Occupational Safety & Health Administration)

75-01-4	vinyl chloride	
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12 Ecological information

· Toxicity
· Aquatic toxicity: No further relevant information available.

· Persistence and degradability No further relevant information available.

· Behavior in environmental systems:
· Bioaccumulative potential No further relevant information available.

· Mobility in soil No further relevant information available.

· Additional ecological information:
· General notes:

Water hazard class 2 (Self-assessment): hazardous for water

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

· Results of PBT and vPvB assessment
· PBT: Not applicable.

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- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.


13 Disposal considerations


- **Waste treatment methods**
- **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- **Not Regulated, De minimus Quantities** -
- **UN-Number**
- **DOT, IMDG, IATA** UN1230
- **UN proper shipping name**
- **DOT** Methanol
- **IMDG, IATA** METHANOL
- **Transport hazard class(es)**
- **DOT**


- **Class** 3 Flammable liquids
- **Label** 3, 6.1
- **IMDG**


- **Class** 3 Flammable liquids
- **Label** 3/6.1
- **IATA**


- **Class** 3 Flammable liquids
- **Label** 3 (6.1)
- **Packing group**
- **DOT, IMDG, IATA** II

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· Environmental hazards:	Not applicable.
· Special precautions for user	Warning: Flammable liquids
· Danger code (Kemler):	336
· EMS Number:	F-E,S-D
· Stowage Category	B
· Stowage Code	SW2 Clear of living quarters.
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· DOT	
· Quantity limitations	On passenger aircraft/rail: 1 L On cargo aircraft only: 60 L
· IMDG	
· Limited quantities (LQ)	1L
· Excepted quantities (EQ)	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· UN "Model Regulation":	UN 1230 METHANOL, 3 (6.1), II

*

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Sara**

· **Section 355 (extremely hazardous substances):**

74-83-9	bromomethane
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· **Section 313 (Specific toxic chemical listings):**

All ingredients are listed.

· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

75-01-4	vinyl chloride
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75-00-3	chloroethane
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· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**

74-87-3	chloromethane
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· **Chemicals known to cause developmental toxicity:**

67-56-1	methanol
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74-87-3	chloromethane
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74-83-9	bromomethane
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· Carcinogenic categories

· EPA (Environmental Protection Agency)

74-87-3	chloromethane	D, CBD
74-83-9	bromomethane	D
75-01-4	vinyl chloride	A, K/L

· TLV (Threshold Limit Value established by ACGIH)

74-87-3	chloromethane	A4
74-83-9	bromomethane	A4
75-01-4	vinyl chloride	A1
75-71-8	dichlorodifluoromethane	A4
75-69-4	trichlorofluoromethane	A4
75-00-3	chloroethane	A3

· NIOSH-Ca (National Institute for Occupational Safety and Health)

74-87-3	chloromethane	
74-83-9	bromomethane	
75-01-4	vinyl chloride	

· National regulations:

· Additional classification according to Decree on Hazardous Materials:

Carcinogenic hazardous material group III (dangerous).

· Information about limitation of use:

Workers are not allowed to be exposed to the hazardous carcinogenic materials contained in this preparation.

Exceptions can be made by the authorities in certain cases.

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· Department issuing SDS: Document Control / Regulatory

· Contact: regulatory@ultrasci.com

· Date of preparation / last revision 03/28/2019 / 3

· Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

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OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit
Flam. Liq. 2: Flammable liquids – Category 2
Acute Tox. 3: Acute toxicity – Category 3
Carc. 1A: Carcinogenicity – Category 1A
STOT SE 1: Specific target organ toxicity (single exposure) – Category 1

· *** Data compared to the previous version altered.**

US

ATTACHMENT F

JOB SITE SAFETY INSPECTION CHECKLIST

Jobsite Safety Inspection Checklist

Date: _____ **Inspected By:** _____

Location: _____ **Project #:** _____

Check one of the following: **A:** Acceptable **NA:** Not Applicable **D:** Deficiency

	A	NA	D	Remark
1. CHASP available onsite for inspection?				
2. Health & Safety Compliance agreement (in CHASP) appropriately signed by Langan employees and contractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8. Appropriate PPE being worn by Langan employees and contractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily, and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field logbook?				
16. Subcontract workers have received 40-hr./8-hr./Spvsnr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Mark outs of underground utilities done prior to initiating any subsurface activities?				
20. Decontamination procedures being followed as outlined in CHASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				

23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layer back, or boxed?				
27. Underground utilities located, and authorities contacted before digging?				
28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

Unsafe Acts:

Notes:

ATTACHMENT G

JOB SAFETY ANALYSIS FORM



Job Safety Analysis (JSA) Construction Health and Safety

JSA TITLE:

JSA NUMBER:

DATE CREATED:

CREATED BY:

REVISION DATE:

REVISED BY:

Langan employees must review and revise the Job Safety Analysis (JSA) as needed to address the any site-specific hazards not identified. Employees must provide their signatures on the last page of the JSA indicating they have review the JSA and are aware the potential hazards associated with this work and will follow the provided preventive or corrective measures.

PERSONAL PROTECTIVE EQUIPMENT REQUIRED: (PPE): ☐ Required ☒ As Needed

- | | | |
|---|--|--|
| <input type="checkbox"/> Steel-toed boots | <input type="checkbox"/> Nitrile gloves | <input type="checkbox"/> Dermal Protection (Specify) |
| <input type="checkbox"/> Long-sleeved shirt | <input type="checkbox"/> Leather/ Cut-resistant gloves | <input type="checkbox"/> High visibility vest/clothing |
| <input type="checkbox"/> Safety glasses | <input type="checkbox"/> Face Shield | <input type="checkbox"/> Hard hat |

ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT NEEDED (Provide specific type(s) or descriptions)

- | | | |
|---|---------------------------------------|---------------------------------|
| <input type="checkbox"/> Air Monitoring: | <input type="checkbox"/> Respirators: | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Dermal Protection: | <input type="checkbox"/> Cartridges: | <input type="checkbox"/> Other: |

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE OR CORRECTIVE ACTION
1.	1. 2.	1a. 1b. 2a. 2b.
2.	1.	1
Additional items identified in the field.		
Additional Items.		

If additional items are identified during daily work activities, please notify all relevant personnel about the change and document on this JSA.

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: COVID-19 Awareness – Site Work

JSA Number: JSA046-00

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work “TAKE 5” and conduct a Last-Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Boots	<input type="checkbox"/> Long Sleeves	<input type="checkbox"/> Safety Vest (Class 2)	<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Hearing Protection
<input type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Alcohol-based hand sanitizer, disinfectant wipes/spray				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. All Activities	1. Transmittal/exposure of COVID-19	1. Ask yourself and your managers – is this work essential? Can this be done remotely? 2. Stay home if sick or showing symptoms of COVID-19 (e.g., fever, cough, etc.). 3. Carry nitrile gloves, alcohol-based hand sanitizer, face coverings and disinfectant wipes/spray during field work. 4. Check federal, state, and/or local travel restrictions prior to travel. Many states, counties, and cities are passing strict “shelter-in-place” or business restrictions in response to COVID-19. 5. Immediately notify Beverly Williams or Rory Johnston (Supervisor if employee chooses) if you display symptoms of COVID-19. Symptoms include fever (over 100.4 F), cough, and shortness of breath. 6. Notify Beverly Williams or Rory Johnston, Supervisor and Coronavirus Task Force if you had close contact with an individual who tested positive or displayed symptoms of COVID-19. 7. Do not touch your face, to the extent possible. 8. Wear face coverings when around other worker to minimize spread of COVID-19. (May be required in certain states or locations.)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		9. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. Avoid gatherings of more than 10 people. Limit, to the extent possible, contact with public items/objects. 10. Clean your hands frequently with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, sneezing, or using the rest room. 11. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry. 12. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. 13. Clean and disinfect frequently touched surfaces daily, for example, cell phones, computer equipment, headsets, tables, doorknobs, light switches, countertops, handles, desks, toilets, faucets, and sinks.
2. Travel to Jobsite	1. Transmittal/exposure of COVID-19 between passengers 2. Transmittal/exposure of COVID-19 from previous occupants (rental and fleet vehicles) 3. Transmittal/exposure of COVID-19 while refueling	1. Limit the number of occupants to each vehicle to 2 people. Employees should sit as far away from each other as possible. 2. Disinfect high "hand-traffic" areas of the vehicle: Door handles, steering wheel, turn signal and control rods, dashboard controls, seatbelts, armrests, etc. To the extent possible, do not use recycled air for heat/AC and travel with the windows open. 3. Use hand sanitizer before and after pumping gas and only return to the inside of the vehicle after refueling is complete. 4. Wear nitrile gloves if available or disinfect the keypad, pump handle, and fuel grade button prior to use. 5. Recommend face coverings are worn to minimize spread of COVID-19.
3. Conduct Tailgate Safety Meeting & Complete H&S Paperwork	1. Transmittal/exposure of COVID-19 between meeting participants	1. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. Hold meetings outside and keep in mind wind direction. To the extent possible, remain crosswind from other people. 4. Designate a single person to maintain sign-in sheets/permits throughout the day to limit the passing of pens/clipboards between people. 5. Each person should complete their own JSA, even if they are completing similar tasks as others in order to limit the passing of paper/pens/clipboards between people. 6. Include COVID-19 topics and prevention measures in safety meetings.
4. Conduct Site Work	1. Transmittal/exposure of COVID-19 between site workers and public.	1. Practice social distancing maintaining 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. To the extent possible, do not interact with the public. If it is necessary, politely explain you are practicing social distance and request they stay at least 6 feet away and they do not attempt to pass objects to you. 4. Wear nitrile gloves during site work underneath the appropriate gloves for your task. Utilize appropriate decontamination procedures, securely bag all waste (including nitrile gloves) generated during site work and dispose of.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		<ol style="list-style-type: none"> Do not share tools. Each person should be equipped with the tools to complete their task or tasks should be divided to remove the need to share tools. If tools must be shared, surfaces should be disinfected. Clean and disinfect surfaces of rental tools and equipment upon receipt. To the extent possible rent equipment from Langan's internal equipment reservation center, where cleaning/disinfecting procedures can be verified.
5. Use of Construction Trailers	1. Transmittal/exposure of COVID-19 between site workers and others.	<ol style="list-style-type: none"> Avoid use of shared trailers, if possible. Minimize trailer use to essential personnel. Practice social distancing; maintaining 6 feet of distance between yourself and others in trailer. Clean and disinfect areas including desks, phones, chairs, and other common areas, before and after use.
6. Purchasing Food from a Restaurant	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	<ol style="list-style-type: none"> To the extent possible, bring your own food. If you must visit a restaurant, call ahead for take-out or "contactless delivery." Do not dine in. When picking up food, follow guidelines for <u>Job Step #8: Purchasing Supplies at Retail/Shipping Centers</u>. Wash hands before and after eating.
7. Smoking Cigarettes	1. Transmittal/exposure of COVID-19 by touching mouth with hands	<ol style="list-style-type: none"> Cigarette smokers are at greater risk of complications arising from COVID-19. Nicotine patches/lozenges/gum, smoking cessation programs, and prescription medications may aid in "kicking the habit" if you decide to quit. Wash hands thoroughly before and after smoking. Discard cigarette butts properly. Do not light cigarettes from others and do not give cigarettes to others.
8. Hotel Stay	1. Transmittal/exposure of COVID-19 from previous occupants, hotel staff, common areas.	<ol style="list-style-type: none"> Verify the hotel chain/brand has modified cleaning procedures to reflect risk of COVID-19. Most hotel companies have issued statements on their websites and in email blasts reflecting these new procedures. Use the front door, and not peripheral entrances. Front doors of hotels are usually automatic. Request ground floor room to avoid elevator use and a room that has not be utilized in 48-72 hours. If elevator use is required, do not directly touch elevator buttons with your hands. Do not ride elevators with other people, to the extent possible. Bring disinfecting wipes or sanitizing spray. Upon arrival, disinfect high "hand-traffic" areas of the hotel room: Door handles, light switches, shower/sink faucet handles, TV remote, curtain/blind handles. Clean these surfaces daily. Place the "Do Not Disturb" Sign on your door to prevent people (housekeeping) from entering your room. Avoid common spaces and hotel sponsored events where crowds will be present. Confirm hotel cleaning procedures have been modified to address COVID-19. Confirm no COVID-19 cases have occurred in hotel
9. Purchasing Supplies at Retail/Shipping Centers	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	<ol style="list-style-type: none"> Plan your travel to limit the need to visit retail/shipping centers. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. If the store is too crowded/small, consider visiting another store or returning at a different time. Avoid high "hand-traffic" items/areas like door handles (i.e. use your shoulder, hip/butt, or open with a disposable napkin/paper towel), credit cards terminals (i.e. use Apple/Android pay if available), shopping carts/baskets (i.e. bring your own shopping

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: Environmental Sampling
JSA Number: JSA021-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input checked="" type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input checked="" type="checkbox"/> Insect/Animal Repellent	<input checked="" type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Drive to sample location	1. Rough/Off Road terrain	1. Pay attention to road conditions such as road erosion, unprotected embankments, and soft road conditions.
2. Sample Collection (Walking)	1. Slip/Trips/Falls 2. Back strains 3. Wildlife (Insects, Stray animals, rodents) 4. Poisonous vegetation	1. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles. 2. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe and unsafe to carry. 3. Be aware of surroundings for the presence of wildlife. Do not approach stray animals. Carry and use animal repellent when needed/ Use bug spray when needed. 4. Keep skin covered/ Identify and avoid poisonous vegetation/ Clean areas after contact with suspected vegetation.
3. Sample Collection (Water)	1. Drowning Hazards 2. Chemical burns (when adding acid preservative to sample) 3. Back Strains 4. Ergonomic issues 5. Slip/Trips/Falls	1. Use buddy system/ Wear flotation vest if water is deeper than 2 feet or swift moving/ Select working area with stable footing. Do not attempt to cross or stand in swift moving water. 2. Wear proper PPE (Nitrile gloves, Tyvek Sleeves) 3. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe or unsafe to carry. 4. When possible, avoid bending over for long periods of time/ Use a small stool for sitting or knee pad for kneeling.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles/ Avoid standing water or slippery terrain.
4.All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: Subsurface Investigation
JSA Number: JSA030-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	2. Back/strain 3. Slip/Trip/Falls 4. Traffic 5. Cuts/abrasions/contusions from equipment 6. Accidents due to vehicle operations	1. Use proper lifting techniques/Use wheeled transport 2. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 5. Observe posted speed limits/ Wear seat belts at all times
6. Traffic	1. Hit by moving vehicle	1. Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.
7. Field Work (drilling, resistivity testing, and inspection)	1. Biological Hazards: insects, rats, snakes, poisonous plants, and other animals 2. Heat stress/injuries 3. Cold Stress/injuries 4. High Energy Transmission Lines 5. Underground Utilities 6. Electrical (soil resistivity testing)	1. Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellant as necessary/ Beware of tall grass, bushes, woods, and other areas where ticks may live/ Avoid leaving garbage on site to prevent attracting animals/ Identify and avoid contact with poisonous plants/Beware of rats, snakes, or stray animals. 2. Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block. 3. Wear proper clothing/ dress in layers/ take regular breaks. 4. Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating).

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Call one-call service before performing intrusive field work/ Review utility mark-outs and available utility drawings (with respect to proposed work locations)/ Follow Underground Utility Guidelines 6. See AGI Sting R1 operating manual for specific concerns during operating instrument
8.All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	7. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 8. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 9. Wear Langan approved safety shoes. 10. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 11. Wear high visibility clothing & vest / Use cones or signs to designate work area. 12. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 13. Wear proper hearing protection. 14. Wear hard hat / Avoid areas where overhead hazards exist. 15. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 16. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: Field Sampling
JSA Number: JSA022-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



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T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input checked="" type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input type="checkbox"/> Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. Unpack/Transport equipment to work area.	7. Back Strains 8. Slip/Trips/Falls 9. Cuts/Abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques/Use wheeled transport. 7. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 8. Wear proper PPE (leather gloves, long sleeves). 9. Wear proper PPE (Langan approved safety shoes).
10. Initial Site Arrival-Site Assessment	5. Traffic	5. Situational awareness (be alert of your surroundings). Secure area from through traffic.
11. Surface Water Sampling	6. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	6. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
12. Sampling from bridges	1. Struck by vehicles	1. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
13. Icing of Samples/Transporting coolers/equipment from work area.	11. Back Strains 12. Slips/Trips/Falls 13. Cuts/Abrasions from equipment 14. Pinch/Crushing Hazards.	17. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 18. Have unobstructed path from work area. Aware of surroundings. 19. Wear proper PPE (Leather gloves, long sleeves) 20. Wear proper PPE (Leather gloves, long sleeves)
14. Site Departure	1. Contaminated PPE/Vehicle	1. Contaminated PPE should be disposed of on-site. Remove boots and soiled clothing for secure storage in trunk. Wash hands promptly.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
15. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 21. Wear high visibility clothing & vest / Use cones or signs to designate work area. 22. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 23. Wear hearing protection 24. Wear hard hat / Avoid areas where overhead hazards exist. 25. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 26. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: Equipment Transportation and Set-up
JSA Number: JSA012-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



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E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
16. Transport equipment to work area	11. Back Strain 12. Slips/ Trips/ Falls 13. Traffic 14. Cuts/abrasions from equipment 15. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport. 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
17. Moving equipment to its planned location	6. Pinch Hazard 7. Slips/ Trips/ Falls	1. Wear proper PPE (leather gloves) 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e., holes, trenches) with safety cones or spray paint
18. Equipment Set-up	7. Pinch Hazard 8. Cuts/abrasions to knuckles/hands. 9. Back Strain	1. Wear proper PPE (leather gloves) 2. Wear proper PPE (leather gloves) 3. Use proper lifting techniques / Use wheeled transport
19. All activities	21. Slips/ Trips/ Falls 22. Hand injuries, cuts, or lacerations during manual handling of materials 23. Foot injuries 24. Back injuries 25. Traffic 26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.)	27. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 28. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 29. Wear Langan approved safety shoes.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	30. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 31. Wear high visibility clothing & vest / Use cones or signs to designate work area. 32. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 33. Wear hearing protection 34. Wear hard hat / Avoid areas where overhead hazards exist. 35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 36. Wear safety glasses
Additional items.		
Additional Items identified while in the field.		
(Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: 55-gallon Drum Sampling
JSA Number: JSA043-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventative/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



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E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety Goggles	<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input checked="" type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: All Drums are required to be labeled. Langan employees do not open or move undocumented drums or unlabeled drums without proper project manager authorization.				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
20. Unpack/Transport equipment to work area.	16. Back Strains 17. Slip/Trips/Falls 18. Cuts/Abrasions from equipment 4. Contusions from dropped equipment	10. Use proper lifting techniques/Use wheeled transport. 11. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 12. Wear proper PPE (leather gloves, long sleeves). 4. Wear proper PPE (Langan approved safety shoes).
21. Open Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 2. Pressure from drums.	1. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 2. Open drum slowly to relieve pressure. Wear proper PPE: face shield and goggles; correct gloves; and over garments.
22. Collecting Soil/Fluid Sample	8. Irritation to eye from vapor, soil dust, or splashing. 9. Irritation to exposed skin	6. Wear proper eye protection including safety glasses/ face shield/goggles and when necessary, splash guard. If dust or vapor phase is present, wear appropriate safety breathing gear (1/2 mask or full face mask with correct filter) 7. Wear proper skin protection including nitrile gloves.
23. Closing Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid.	7. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
24. Moving Drums	2. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 3. Back Strains	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 3. Use proper lifting techniques/Use wheeled transport.
25. All activities	31. Slips/ Trips/ Falls 32. Hand injuries, cuts, or lacerations during manual handling of materials 33. Foot injuries 34. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	37. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 38. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 39. Wear Langan approved safety shoes. 40. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 41. Wear high visibility clothing & vest / Use cones or signs to designate work area. 42. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 43. Wear hearing protection 44. Wear hard hat / Avoid areas where overhead hazards exist. 45. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 46. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: Direct-Push Soil Borings
JSA Number: JSA004-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
26. Move equipment to work site	19. Back strain when lifting equipment. 20. Slips/ Trips/ Falls while moving equipment. 21. Traffic (if applicable) 22. Pinched fingers or running over toes during GeoProbe set-up. 23. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	13. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 14. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 15. Wear high visibility safety vests or clothing / Exercise caution 16. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 17. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
27. Calibration of monitoring equipment	10. Skin or eye contact with calibration chemicals 11. Pinch fingers in monitoring equipment	8. Wear proper PPE (safety glasses/ goggles) 9. Wear proper PPE (leather gloves)
28. Set-up GeoProbe rig	10. Geoprobe rig movement	8. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
29. Advance GeoProbe rods below ground surface to desired depth	4. Underground utilities 5. High noise levels	4. Clean all subsurface soil borings to a minimum of 5 feet below grade. 5. Wear proper PPE (hearing protection)
30. Remove and open acetate liner.	41. Pinched fingers while removing macrocore.	1. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	42. Cuts/lacerations when cutting acetate liner open. 43. Exposure to hazardous vapors 44. Skin contacts with contaminated soil	3. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Construction Health and Safety Plan 4. Wear proper PPE (nitrile gloves)
31. Sample Collections a) Monitor parameters. b) Prepare sample containers and labels	1. Contact with potentially contaminated soil. 2. Lacerations from broken sample bottles 3. Back strain while transporting full coolers. 4. Internal exposure to contaminants and metals through inhalation of dust 5. Slips/ Trips/ Falls	1. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 2. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage. 6. Use proper lifting techniques / Do not lift heavy loads without assistance. 7. Avoid creating dust / If necessary, wear a half mask respirator with applicable dust cartridge / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location. 8. Be alert / Follow good housekeeping procedures
32. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Cuts/lacerations from acetate liner 2. Pinched fingers/hand while opening/closing drum. 3. Skin contacts with contaminated soil 4. Soil debris in eyes	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (nitrile gloves) 4. Wear proper PPE (safety glasses)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
8. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Back, arm or shoulder strain from moving drums. 2. Pinch fingers/hand in drum cart when moving drums. 3. Pinch fingers/hand when operating lift-gate on vehicle. 4. Contact with potentially contaminated groundwater when moving improperly sealed drums. 5. Slips when moving drums. 6. Drop drum on feet/toes	47. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance. 48. Wear proper PPE (cut-resistant or leather gloves) 49. Wear proper PPE (cut-resistant or leather gloves) 50. Wear proper PPE (nitrile gloves underneath work gloves) 51. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions. 52. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum
9. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 3. Wear Langan approved safety shoes. 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 5. Wear high visibility clothing & vest / Use cones or signs to designate work area. 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 10. Wear safety glasses
9. All activities (cont'd)	10. Eye Injuries	
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
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LANGAN

Job Safety Analysis (JSA) Construction Health and Safety

JSA Title: Geophysical Investigation
JSA Number: JSA023-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input type="checkbox"/> Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
33. Transport equipment to work area	24. Back/strain 25. Slip/Trip/Falls 26. Traffic 27. Cuts/abrasions/contusions from equipment	18. Use proper lifting techniques/Use wheeled transport 19. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 20. Wear proper PPE (high visibility vest or clothing) 21. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes)
34. Supervision of subcontractor and all other activities	12. Slip/Trips/Falls 13. Hand injuries 14. Foot injuries 15. Back injuries/Strains 16. Traffic 17. Wildlife a. Wildlife b. Mice/rats c. Vectors (i.e., mosquitoes, bees, etc.) 7. Heat/Cold Stress	10. Be aware of potential trip hazards/follow good housekeeping procedures/mark significant below-grade hazards (i.e., holes, trenches, wires, ropes) with safety cones or spray paint. 11. Wear proper PPE (leather gloves)/watch wear you place your hands/inspect material or equipment for jagged, rough, or slippery surfaces/ watch for pinch points/ wipe off slippery, wet, or dirty items prior to handling. 12. Wear proper PPE (Langan approved safety shoes)/ Be aware of uneven terrain) 13. Use proper lifting techniques/ Buddy system when lifting/ use wheeled transport. 14. Wear proper PPE (high-visibility shirts and vests)/ use cones if appropriate/ notify equipment operators of work area. 15. Be aware of surroundings at all times for the presence of wildlife. a. Do not approach stray animals. b. Carry animal repellent/ use if situation arises. c. Use bug spray when needed. 7. Wear proper attire for weather conditions (sunscreen, protective clothing in

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		sunlight or layer clothing in cold weather)/ drink plenty of fluids/ take regular breaks.
35. All activities	45. Slips/ Trips/ Falls 46. Hand injuries, cuts, or lacerations during manual handling of materials 47. Foot injuries 48. Back injuries 49. Traffic 50. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 51. High Noise levels 52. Overhead hazards 53. Heat Stress/ Cold Stress 54. Eye Injuries	53. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 54. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 55. Wear Langan approved safety shoes. 56. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 57. Wear high visibility clothing & vest / Use cones or signs to designate work area. 58. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 59. Wear proper hearing protection. 60. Wear hard hat / Avoid areas where overhead hazards exist. 61. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 62. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Health and Safety

JSA Title: Excavation Oversight

JSA Number: JSA041-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – Stop, what has changed?

T – Think about the task

E – Evaluate potential hazards

P – Plan safe approach

S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
36. Transport equipment to work area	28. Back Strain 29. Slips/Trips/Falls 30. Traffic 31. Cuts/abrasions/contusions from equipment	22. Use proper lifting techniques / Use wheeled transport 23. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 24. Wear proper PPE (high visibility vest or clothing) 25. Wear proper PPE (leather gloves, long sleeves, safety shoes)
37. Earth Moving Equipment	18. Equipment running over employee 19. Swing radius of equipment 20. Site constraints 21. Line of Fire incidents 22. Crushing hazards	16. Ensure you have direct line of sight with operator of equipment; 17. Don't walk behind equipment; 18. Maintain a safe distance away from equipment. 19. Use spotters to communicate with equipment operator 20. Competent person onsite 21. Designate/cone-off swing radius of equipment 22. Excavator bucket grounded while collecting samples 23. Shut-down equipment prior to collecting samples 24. Wear proper PPE (high vis vest/clothing)
38. Excavation	11. Excavation collapse 12. Confined space 13. Soil	9. Use proper shoring/benching/sloping techniques; Ladder is properly situated in excavation; no water in excavation; competent person has inspected excavation prior to allow employees to enter. 10. Langan employees are not authorized to enter a confined space; 11. Soil and equipment is kept at least 2 feet from edge of excavation
39. Excavated soil	1. Hazardous substances	1. Use proper equipment to monitor excavated soil for contaminants; ensure levels do not exceed PEL's for contaminants; Wear proper PPE
40. All activities	55. Slips/ Trips/ Falls	63. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards

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LANGAN

Job Safety Analysis (JSA) Health and Safety

JSA Title: General Construction Activities
JSA Number: JSA010-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input checked="" type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
41. Transport equipment to work area	32. Back Strain 33. Slips/ Trips/ Falls 34. Traffic 35. Cuts/abrasions from equipment 36. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
42. Installation of piping from vapor wells to skid connections and from discharge piping to effluent stack	23. Pinch fingers when connecting pipes 24. Slips/ Trips/ Falls 25. Machinery Hazards	3. Wear proper PPE (leather gloves) 4. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 5. Wear proper PPE (safety vest) / Maintain safe distance from operating machinery
43. Remediation equipment installation	14. Back strain when lifting heavy equipment 15. Slips/ Trips/ Falls 16. Traffic	5. Use proper lifting techniques / Use wheeled transport / Minimize distance to vehicle 6. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 7. Wear proper PPE (safety vest)
44. All activities	65. Slips/ Trips/ Falls 66. Hand injuries, cuts or lacerations during manual handling of materials 67. Foot injuries 68. Back injuries	73. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant hazards 74. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves

LANGAN

Job Safety Analysis (JSA) Health and Safety

JSA Title: Ladder Use
JSA Number: JSA056

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input type="checkbox"/> Long Sleeves	<input type="checkbox"/> Safety Vest (Class 2)	<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input checked="" type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input type="checkbox"/> Other: 				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
45. Use of Ladders and Inspection of Ladders Before Use	1. Ladders (portable, fixed) 2. Rolling or pinching objects 3. Sharp objects	26. Inspect all ladders for structural defects prior to each use. Decals, weight restrictions, non painted surfaces. 27. Use the correct type and size of ladder to safely work. 28. . Do not use metal or wooden ladders
46. Use of Ladder(s)	26. Ladders (portable, fixed) 27. Elevated work platform or stairs 28. Slippery surfaces (water, ice, snow) 29. Rolling or pinching objects 30. Sharp objects 31. Poor Housekeeping 32. Repetitive motion or other ergonomic concerns 33. Airborne dust	25. Maintain three points of contact when ascending and descending ladders. 26. Insure area at bottom of ladder is free of obstructions and tripping hazards. 27. Never carry tools in your hands while ascending or descending a ladder. 28. Utilize rope buckets to pull tools up to you or tool belts. Extension ladders will extend up to 36 inches above the landing that is being accessed and be tied off and secured to prevent them from moving or falling. 29. A spotter must hold the ladder if the employee needs to climb the ladder to tie the ladder off. When using an extension ladder, for every 4' of rise, the base must come out 1' (4 to 1 ratio) 30. If working from a ladder 6 ft. or higher, fall protection is required. Fall protection is not required for climbing ladders less than 20 ft. in height.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		<p>31. Use the proper ladder for the job at all times.</p> <p>32. The belt buckle may never extend past either rail on the side of the ladder.</p> <p>33. Do not climb higher than the second tread from the top on a stepladder or the third rung</p> <p>34. Before ascending or descending a ladder, wait until other workers have completely cleared the ladder. Do not stand directly below a person who is climbing or descending a ladder to avoid falling objects.</p>
47. All activities	<p>75. Slips/ Trips/ Falls</p> <p>76. Hand injuries, cuts or lacerations during manual handling of materials</p> <p>77. Foot injuries</p> <p>78. Back injuries</p> <p>79. Eye Injuries</p>	<p>83. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards</p> <p>84. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves</p> <p>85. Wear proper PPE (Langan approved safety shoes)</p> <p>86. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible</p> <p>87. Wear high visibility clothing & vest / Use cones or signs to designate work area</p> <p>88. Wear hard hat / Avoid areas were overhead hazards exist.</p> <p>89. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress</p> <p>90. Wear safety glasses</p>

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<u>Prepared by:</u>		
<u>Reviewed by:</u>		

LANGAN

Job Safety Analysis (JSA) Health and Safety

JSA Title: Mechanical Connection Oversight
JSA Number: JSA027-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
48. Transport equipment to work area	37. Back Strain 38. Slips/ Trips/ Falls 39. Traffic 40. Cuts/abrasions from equipment 41. Contusions from dropped equipment	11. Use proper lifting techniques / Use wheeled transport 12. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 13. Wear proper PPE (high visibility vest or clothing) 14. Wear proper PPE (leather gloves, long sleeves) 15. Wear proper PPE (Langan approved safety shoes)
49. Piping and connections	6. Pinch Hazard 7. Cuts/abrasions to knuckles/hands 8. Back Strain 9. High pressure water spray	1. Wear proper PPE (leather gloves) 2. Wear proper PPE (leather gloves or cut resistant gloves) 3. Use proper lifting techniques / Use wheeled transport 4. Ensure connections are tight and secure/ Wear proper PPE (face shield and safety glasses)
50. All activities	80. Slips/ Trips/ Falls 81. Hand injuries, cuts or lacerations during manual handling of materials 82. Foot injuries 83. Back injuries 84. Traffic 85. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 86. High Noise levels 87. Overhead hazards 88. Heat Stress/ Cold Stress 89. Eye Injuries	91. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 92. Inspect for jagged/sharp edges, rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather and/or cut-resistant gloves 93. Wear Langan approved safety shoes 94. Use proper lifting techniques / Consider load location, task repetition, and load weight / Obtain assistance when possible 95. Wear high visibility clothing & vest / Use cones or signs to designate work area 96. Be aware of surroundings for presence of wildlife/ Do not approach stray animals / Carry or use animal repellent / Use bug spray when needed

LANGAN

Job Safety Analysis (JSA) Health and Safety

JSA Title: Soil Sampling from Excavator Bucket
JSA Number: JSA057

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – Stop, what has changed?
T – Think about the task
E – Evaluate potential hazards
P – Plan safe approach
S – Start task / Stop & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

<input checked="" type="checkbox"/> Safety Shoes	<input type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input checked="" type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input type="checkbox"/> Other: 				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
51. Drive to site and/or sample location.	42. Rough/Off-Road terrain; 43. Low-light or other hazardous environmental conditions.	1. Pay attention to road conditions such as road erosion, unprotected embankments, and soft road conditions; 2. Ensure vehicle is properly equipped and outfitted for the terrain and all environmental conditions.
52. Initial Site Arrival Site Assessment.	1. Unsafe driving conditions including personnel walking within driving areas, open excavation or pits, steep slopes etc.; 2. Biological hazards (snakes, poison oak, bees).	1. Maintain situational awareness upon arriving to the work site (be alert of your surroundings). Secure the work area from through traffic.
53. Unpack and transport equipment to work area.	1. Back Strains; 2. Slip/Trips/Falls; 3. Cuts/Abrasions from equipment; 4. Contusions from dropped equipment.	1. Use proper lifting techniques and use wheeled transport; 2. Minimize distance to work area and create unobstructed path to work area. Follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones and/or caution tape; 3. Wear proper PPE (gloves, long sleeves, etc.); 4. Wear proper PPE (Langan-approved safety shoes, hardhat, etc.).
54. Earth Moving Equipment.	1. Equipment striking, crushing, running over employee etc.	1. Place traffic cones and use caution tape to clearly delineate the excavators front and rear swing radius. Do not enter the excavators or other heavy equipment swing radius/travel paths while in operation; 2. Ensure all employees working in the vicinity of the excavator/heavy equipment maintain direct line of sight with the operator at all times; don't walk behind equipment or within the operators blind spots; maintain a safe distance away from the equipment; 3. Designate one employee as the "spotter" to communicate with the excavator operator, and establish a shut-down signal that, when

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		<p>sounded, instructs the excavator operator to freeze/stop all movement of the equipment;</p> <ol style="list-style-type: none"> Direct operator to completely power down the excavator before approaching (i.e. breaking the swing radius plane) the excavator bucket to collect a sample; Direct the operator keep the equipment completely powered-down until all employees are at a safe distance, and it is safe to continue work. The designated spotter should be the only person directing the operator to power the equipment back on. Conduct a planned pause anytime there is a change in procedure or before beginning a new task; Wear proper PPE (high vis vest/clothing).
55. Icing of Samples & Transporting coolers/equipment from work area.	<ol style="list-style-type: none"> Back Strains Slips/Trips/Falls Cuts/Abrasions from equipment Pinch/Crushing Hazards. 	<ol style="list-style-type: none"> Drain coolers of water. Use proper lifting techniques. Use wheeled transport whenever possible; Plan for and utilize a safe and unobstructed path of travel to and from work area. Maintain situational awareness when traveling to and from work area; Wear proper PPE (Leather gloves, long sleeves); Wear proper PPE (Leather gloves, long sleeves, hard hat, Langan approved safety shoes).
56. Excavated soil.	<ol style="list-style-type: none"> Hazardous substances. 	<ol style="list-style-type: none"> Use proper equipment to monitor excavated soil for contaminants; Ensure levels do not exceed PEL's for contaminants; Wear proper PPE.
57. Changing site conditions.	<ol style="list-style-type: none"> Stockpiles and/or excavations/trenches/pits creating unsafe paths of travel. Unforeseen conditions 	<ol style="list-style-type: none"> Take time to plan out stockpile, excavation, trench, and/or test pit locations, ensuring that the planned work will not create unsafe conditions or paths of travel once performed; Maintain situational awareness throughout the work day (be alert of the evolving site conditions); If stockpile, excavation, trench, and/or test pit locations create pinch points, site constraints, or unsafe paths of travel or other unsafe site conditions, stop work immediately and direct the excavator operator to correct the unsafe conditions by moving stockpiles, backfilling excavations, trenches, and/or test pits etc.; Use stop work and conduct a planned pause to address changed site conditions.
58. All activities.	<ol style="list-style-type: none"> Slips/ Trips/ Falls; Hand injuries, cuts or lacerations during manual handling of materials; Foot injuries; Back injuries; Traffic; Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.); High Noise levels; Overhead hazards; Heat Stress/ Cold Stress; Eye Injuries. 	<ol style="list-style-type: none"> Be aware of potential trip hazards. Follow good housekeeping procedures. Mark significant hazards; Inspect for jagged/sharp edges, and rough or slippery surfaces. Keep fingers away from pinch points. Wipe off greasy, wet, slippery or dirty objects before handling. Wear proper PPE (leather/ cut-resistant gloves); Wear proper PPE (Langan approved safety shoes); Use proper lifting techniques. Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift. Obtain assistance when possible; Wear high visibility clothing & vest / Use cones or signs to designate work area;

[illegible]

LANGAN

Job Safety Analysis (JSA) Health and Safety

JSA Title: Site Inspection
JSA Number: JSA024-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



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<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input checked="" type="checkbox"/> Rubber Boots
<input checked="" type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input checked="" type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
59. Jobsite Pre-briefing	44. None	29. Review JSA, SOP's, and discuss hazards that may be present and control measures for present hazards while on-site.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
2. Working near railroads	1. Passing Trains. 2. Slip/Trips/Falls.	1. Wear reflective vest/ Stay away from tracks/ Do not cross tracks within 10 ft. of train car or when there is a train within view/listen for train horn. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
3. Walking around site	10. Uneven terrain 11. Wildlife: Stray animals, mice/rats, vectors (i.e. mosquitoes, bees, etc.) 12. Weather: Heat/cold stress 13. Slip/Trips/Falls 14. Foot injuries 15. Eye injuries	9. Pay attention to surrounding area (puddles, wet, frozen, uneven areas); Mark with cones or spray paint. 10. Use bug spray/ Avoid stray animals/Use repellant when needed. 11. Dress for the correct weather situation/ Use sunscreen or protective clothing in sunlight, layers in cold weather/ Drink plenty of fluids/ Take breaks when needed. 4. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones. 5. Wear proper PPE (Langan approved safety shoes)/ Change wet socks during cold weather. 6. Wear proper PPE (safety glasses/goggles).
4. Working near road	1. Passing vehicles 2. Slip/Trips/Falls	1. Wear reflective vest/ Stay away from roadway/ Use buddy system/ Place signage or cones when needed. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
5. All activities	90. Slips/ Trips/ Falls 91. Hand injuries, cuts or lacerations during manual handling of materials 92. Foot injuries 93. Back injuries 94. Traffic 95. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 96. High Noise levels 97. Overhead hazards 98. Heat Stress/ Cold Stress 99. Eye Injuries	101. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 102. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 103. Wear Langan approved safety shoes 104. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 105. Wear high visibility clothing & vest / Use cones or signs to designate work area 106. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 107. Wear hearing protection 108. Wear hard hat / Avoid areas where overhead hazards exist. 109. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Take breaks as necessary to avoid heat/cold stress 110. Wear safety glasses
Additional items.		

ATTACHMENT H

TAILGATE SAFETY BRIEFING FORM

LANGAN TAILGATE SAFETY BRIEFING

Date: _____

Time: _____

Leader: _____

Location: _____

Work Task:

SAFETY TOPICS (provide some detail of discussion points)

Chemical Exposure Hazards and Control: _____

Physical Hazards and Control: _____

Air Monitoring: _____

PPE: _____

Communications: _____

Safe Work Practices: _____

Emergency Response: _____

Hospital/Medical Center Location: _____

Phone Nos.: _____

Other: _____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.)

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

ATTACHMENT 11

NYSDOH GENERIC COMMUNITY AIR MONITORING PROGRAM

Appendix 1A

New York State Department of Health Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009