207TH STREET / 9TH AVENUE

375 WEST 207th STREET (a.k.a. 3875 9th AVENUE)

NEW YORK COUNTY

INWOOD, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C231102

USEPA ID # NYR000242164

Prepared for:

J.207 ST LLC

MFC REALTY CORP

207 Street Owner LLC

Sherman Creek Owner LLC

Sherman Creek Master Tenant LLC

HP 3875 Ninth Avenue Housing Development Fund Company, Inc.

HP Sherman Creek Housing Development Funding Company, Inc.

Sherman Creek LIHTC Owner, LLC

Prepared by:

GEI Consultants, Inc.

1000 New York Avenue, Suite B

Huntington Station, New York 11746

631-760-9300

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

SEPTEMBER 2024

I GARY ROZMUS certify that I am currently a NYS registered professional engineer as in defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

_____ P.E.

OCTOBER 25, 2024 DATE

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NEW YORK COUNTY

INWOOD, NEW YORK

SITE MANAGEMENT PLAN

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ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
EWP	Excavation Work Plan
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
P.E. or PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVI	Soil Vapor Intrusion

TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for 207th Street/9th Avenue (the Site), as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan (SMP):

Site Identification:	C231102 207th Street / 9th Avenue 375 West 207th Street (a.k.a. 3875 9th Avenue), New York, New York

Institutional Controls:	1. The property may be used for restricted residential use.	
	2. Environmental Easement	
	3. All ECs must be inspected at a frequency and in a manner defined in the SMP.	
Engineering Controls:	1. Cover system	
Inspections:		Frequency
1. Cover inspection		Annually
Monitoring:		
1. Soil Vapor Intrusion Evaluation for New Building		As needed
Reporting:		
1. Soil Vapor Instruction Evaluation Report		45 days following sample event
2. Periodic Review Report		16 months following issuance of COC, annually for one year, and every three years thereafter

Further descriptions of the above requirements are provided in detail in the latter sections of this SMP.

1.0 INTRODUCTION

1.1 General

This SMP is a required element of the remedial program for the 207th Street / 9th Avenue Site located in Inwood, New York (hereinafter referred to as the "Site"). See Fig. 1. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C231102, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department). The Site entered the BCP under the previous Site address (3875 9th Avenue), which has since been updated to the address of the new residential building (375 West 207th Street).

J.207 ST LLC and MFC REALTY CORP. entered into a Brownfield Cleanup Agreement (BCA) on February 23, 2017, with the NYSDEC to remediate the Site. The BCA was amended as follows:

Amendment 1, November 12, 2021

a. Change of Ownership to: HP 3875 Ninth Avenue Housing Development Fund Company, Inc.; and

b. Added five new Requestors as Volunteers to the BCA
   I. 207 Street Owner LLC
   II. Sherman Creek Owner LLC
   III. Sherman Creek Master Tenant LLC
   IV. HP 3875 Ninth Avenue Housing Development Fund Company, Inc.
   V. HP Sherman Creek Housing Development Funding Company, Inc.

Amendment 2, January 22, 2023

a. Added one new Requestor as a Volunteer to the BCA
   I. Sherman Creek LIHTC Owner, LLC

Amendment 3, October 31, 2023

a. Change of Ownership to: HP Sherman Creek Housing Development Fund Co., Inc.
b. Change of Beneficial Owner from: 207 Street Owner LLC to Sherman Creek Owner LLC and Sherman Creek LIHTC Owner LLC
c. Change of Site Address from 3875 9th Avenue New York, NY 10034 to 375 West 207 Street New York, NY 10034

A figure showing the Site location and boundaries of this Site is provided in Fig. 2. The boundaries of the Site are more fully described in the metes and bounds Site description that is part of the Environmental Easement provided in Appendix A.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the Site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC and recorded with the New York County Clerk, requires compliance with this SMP and all ECs and ICs placed on the Site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC); and
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA (Index #231102-11-16; Site #C231102) for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in NYS. A list of contacts for persons involved with the Site is provided in Appendix B of this SMP.

This SMP was prepared by GEI Consultants, Inc., on behalf of original requestors J.207 ST LLC and MFC Realty Corp., and the additional requestors 207th Street Owner LLC, Sherman Creek Master Tenant LLC, Sherman Creek Owner LLC, HP 3875 Ninth Avenue Housing Development Fund Company, Inc., Sherman Creek LIHTC Owner, LLC, and HP Sherman Creek Housing Development Fund Co., Inc. (Remedial Parties), in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and most recently updated on April 19, 2019, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the Site conditions. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawings must be stamped by a NYS Professional Engineer (PE). In accordance with the Environmental Easement for the Site, the NYSDEC project manager will provide a notice of any approved changes to the SMP and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of any proposed changes in Site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law.
2. 7-day advance notice of any field activity associated with the remedial program.
3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (EWP). If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.
4. Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
5. Notice within 48 hours of any non-routine maintenance activities.
6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

1. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the BCA, and all approved work plans and reports, including this SMP.
2. Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in Appendix B.

Table 1. Notifications*

Name	**Contact Information**	**Required Notification****
Kyle Forster, NYSDEC Project Manager	(518) 402-8644 kyle.forster@dec.ny.gov	All Notifications
Sarah Quandt, P.E., NYSDEC Project Manager's Supervisor	518-402-9116 sarah.quandt@dec.ny.gov	All Notifications
Kelly Lewandowksi, NYSDEC Site Control	518.402.9553 kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Steven Berninger, NYSDOH Project Manager	518-402-7860 steven.berninger@health.ny.gov	Notifications 4, 6, and 7

* Note: Notifications are subject to change and will be updated as necessary.

** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located in New York, New York County, New York and is identified as Block 2188 and Lot 1 on the New York City Tax Map (see Fig. 2). The Site is an approximately 71,575 square feet (SF) (1.64-acre) area and is bounded by a small inlet of the adjacent Harlem River identified as the North Cove to the north, beyond which is a railyard owned by New York City Transit Authority, which serves as a major overhaul facility, a car wash, and train car restoration and storage yard to the north, West 207th Street/University Heights Bridge approach to the south, the de-mapped Exterior Street followed by the Harlem River to the east, and 9th Avenue to the west (see Fig. 2 – Site Plan). The boundaries of the Site are more fully described in Appendix A – Environmental Easement. The owner of the Site at the time of issuance of this SMP is HP Sherman Creek Housing Development Fund Company, Inc.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: a building shell and vapor barrier, with enclosed parking, a minimum of 24 inches of clean, imported Item 4 stone, in all areas surrounding the building. All remedial work has been completed in accordance with the NYSDEC Decision Document and approved RAWP. Any future Site improvements will be conducted in accordance with this SMP. The Site is zoned residential and is currently under redevelopment into a 35-story mixed-use, fully affordable residential building. Site occupants will include ground-floor commercial spaces and associated indoor parking, a residential lobby, and residential apartments. At the completion of all Site improvements, the Site will include sidewalks on the west and south sides of the building, access to a New York City Parks Department comfort station in the northern portion of the building, and a waterfront esplanade, including walkways and landscaping, on the east side of the building.

The properties adjoining the Site, and in the neighborhood surrounding the Site, primarily include commercial, and residential properties, as well as a New York City

Transit Authority railyard to the north. The properties immediately south of the Site include West 208th Street and the approach to the University Heights Bridge, followed by commercial properties; the properties immediately north of the Site include a New York City Park and North Cove followed by commercial/industrial properties (i.e., MTA railyard); the properties immediately east of the Site include the de-mapped Exterior Street followed by the Harlem River; and the properties to the west of the Site include commercial, and residential properties, some of which are undergoing redevelopment.

2.2.2 Geology

Site soil and stratigraphy were characterized during the Remedial Investigation (RI) and the geotechnical investigations conducted prior to redevelopment. Generally, the subsurface conditions encountered beneath the asphalt paved parking lot consisted of fill material overlain by natural glacial soil deposits, along with peat and organic matter. The fill layer extended to approximately 10 to 12 feet below land surface (ft bls) in most locations across the Site consisting primarily of sand with varying percentages of silt, gravel, and construction debris (bricks, metal, tires). Bedrock was not encountered during the RI, however; geotechnical borings encountered bedrock at depths ranging from approximately 77 ft bls on the western side of the Site to approximately 155 ft bls on the eastern side of the Site.

A geologic cross section is shown in Figs. 3, 4, and 5. Site specific boring logs are provided in Appendix C.

2.2.3 Hydrogeology

No evidence of perched water was observed during the RI. Based upon regional topography groundwater is presumed to flow in a northeasterly direction toward the adjacent Harlem River, and to be tidally influenced. Groundwater was measured during the RI in the monitoring wells located on-Site and was observed to vary between approximately 5 to 11 ft bls. Groundwater levels were also obtained during the geotechnical work in July 2018 to provide the necessary data for foundation design. The groundwater data collected was consistent with that from the RI, where measured

groundwater levels ranged from 5.6 to 11.5 ft bls across the Site and were observed to fluctuate with the tide.

The permanent wells were surveyed in May 2018; based upon this survey the groundwater elevations were calculated. These measurements appeared to indicate the tide was influencing groundwater levels during the RI. Consistent with the RI observations, the geotechnical investigation also noted a reverse gradient, where groundwater appeared to flow away from the Harlem River. Although no dewatering activities are known at this time, it was suggested this unexpected groundwater flow gradient could be attributable to nearby pumping or dewatering. Unknown former below grade structures related to the historical waterfront (i.e., buried bulkheads, cribbing, etc.) could also be influencing the Site groundwater flow.

Two additional groundwater gauging events were conducted on November 9, 2018, one to correspond with each of the high and low tide cycles for the day. Consistent with previous gauging results, groundwater was observed at higher elevations near the Harlem River than inland near 9th Avenue, and fluctuates in elevation with the tide, with the flow direction remaining similar regardless of whether measurements are collected at high or low tide. All wells were decommissioned prior to excavation activities for redevelopment.

A groundwater contour map is shown in Fig. 6. Groundwater elevation data is provided in Table 2.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

Phase I Environmental Site Assessment (ESA) – 3875 9th Avenue Block 2188, Lots 1 and 10, September 2014

AKRF, Inc. (AKRF) conducted a Phase I ESA in September 2014 of Lots 1 and 10 (these lots were subsequently combined into Lot 1). The assessment included a Site

inspection, historical research, and a regulatory review of the Site. The report identified the following Recognized Environmental Conditions (RECs) at the Site: Historical uses of the property included: a 1-story (plus basement) auto sales and service shop in the southwestern corner, auto wrecking in the northwestern corner, houseboat mooring, trailer parking, dumping, and vacant land. The eastern portion of the Site was submerged within the Harlem River until the mid-20th century and was filled between 1951 and 1968 with material of unknown origin. The former bed of the Harlem River beneath this portion of the Site has a high potential to contain hazardous materials.

No evidence of past or present on-Site petroleum storage tanks was identified. However, historical uses of the Site (particularly the auto service building present in its southwestern corner between 1931 and 1954) would likely have included tanks, which may have been removed or may remain beneath the Site.

The surrounding area historically included a laundry and cleaner (which may have used petroleum-based solvents based on their age), a carpet cleaner (which may have used chlorinated solvents based on its age), a boat works, filling stations, garages with gasoline USTs, auto repair shops, and factories. A large rail yard was constructed north and northwest of the Site across 9th Avenue between 1922 and 1928. The rail yard and a filling station located west of the Site across 9th Avenue were observed during the reconnaissance and were identified in the regulatory database with active- and closed status spill listings, hazardous waste generator listings, and petroleum bulk storage (PBS) tank registrations. A monitoring well observed west-adjacent to the Site in the 9th Avenue sidewalk may have been associated with an investigation conducted by the filling station. The south-adjacent University Heights Bridge may be covered with lead-based paint, which may have affected shallow soils at the Site (particularly before the entire Site was paved).

Phase II ESA – 3875 9th Avenue Block 2188, Lots 1 and 10, October 2014

AKRF conducted a Phase II ESA in October 2014 of Lots 1 and 10. The assessment included installation of seven soil borings and collection of 14 soil samples, installation of four soil vapor points and collection of four soil vapor samples, and installation of three temporary groundwater points and collection of three groundwater samples. The report identified the following conclusions and recommendations:

- The Phase II identified: an area with potential petroleum contamination (and low-level VOC contamination in groundwater) in the eastern portion of the Site, urban fill materials containing somewhat elevated concentrations of SVOCs and metals (and lower levels of pesticides and PCBs) throughout the Site; low levels of chlorinated solvents in Site soil and groundwater; and elevated concentrations of chlorinated solvent- and petroleum-related VOCs in soil gas.
- To address the potential for encountering known or unexpected contamination during Site redevelopment, and to reduce the potential for vapor intrusion following the redevelopment, future construction should be performed in accordance with a Remedial Action Plan (RAP). Vapor control measures (at a minimum, a vapor barrier/ waterproofing membrane beneath the foundation slab and outside of below-grade sidewalls) should be included in the RAP. The RAP should include the requirement that any new landscaped areas be capped with a layer of imported clean fill to the extent this is practical (e.g., soil disturbance and fill placement may be limited in wetland-adjacent areas).
- Soil and fill materials excavated as part of Site development activities should be properly handled and managed in accordance with applicable regulations, including hazardous waste disposal regulations. Transportation of material leaving the Site for off-site disposal must be in accordance with Federal, State, and local regulatory requirements covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.

Remedial Investigation Report (RIR) – 3875 9th Avenue, September 2018

Soil, groundwater, and soil vapor have been most recently characterized by GEI Consultants, Inc., P. C. (GEI) in an April-May 2018 RI. This investigation, approved by the NYSDEC, included the completion of a geophysical survey and analysis of samples from soil, groundwater, and soil vapor.

A Supplemental Remedial Investigation (SRI) was performed in November 2018 as requested by NYSDEC. Results are detailed in a Supplemental Remedial Investigation letter report (SRIR) and are summarized below.

Soil Summary

The identified soil impacts are present within the fill unit on Site and primarily consist of semi-volatile organic compounds (SVOCs) and metals, typical of urban or historical fill within the area. The contaminated fill layer was present throughout the Site and typically consisted of sand with varying amounts of silt, brick, metal, and other debris, and was observed to approximately 10 to 12 ft bls in most locations.

The identified soil impacts primarily consisted of SVOCs and metals and may be attributable to the former auto wrecking operations that occurred historically during 1924 to 1954 and to the fill material of an unknown origin placed on Site between 1951 and 1968. Petroleum-related impacts were found in soil in one boring (SB-111) to a depth of 14 ft bls. No off-site sources were identified.

Groundwater Summary

Groundwater at the Site had detections of volatile organic compounds (VOCs), SVOCs, and metals above Ambient Water Quality Standards (AWQS). Total perfluorooctanic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) was detected above the 70 nanograms per liter (ng/L) screening level at two locations, MW-105 and MW-111, which are located on the northern and eastern portion of the Site, respectively.

Past uses of the Site and surrounding area did not indicate a possible on-Site or off-Site source for PFOA or PFOS. Furthermore, there are no known historical major fires (on-Site or adjacent to the Site) in which firefighting foam (a common source of PFOA/PFOS) may have been used. 1,4-Dioxane was also detected above the 0.35 micrograms per liter (µg/L) screening level at one location, MW-111. VOC exceedances were detected in two monitoring wells (MW-103 and MW-111) and SVOC exceedances were exceeded in one monitoring well (MW-111). Petroleum-related VOCs and SVOCs were detected in MW-111. Monitoring well MW-111 was resampled for SVOCs in November 2018 and the detections were less than the detections in the May 2018 RI. The lower concentrations detected may be attributed to the presence of sediment in the May 2018 groundwater sample and therefore the November 2018 sample provides a more realistic representation of the groundwater concentrations present. All other SVOCs were either not detected or were below the AWQS. Chlorinated VOC exceedances were detected in one monitoring well (MW-103) on the western side of the Site.

Other than the fill unit and the impacts noted in SB-111, no other on or off-Site source areas were identified as potentially attributable to the MW-103 and MW-111 impacted groundwater. Metals were detected at the highest concentrations in the north and east portions of the Site. Total iron was detected above the AWQS in four of the five groundwater samples but did not exceed the dissolved AWQS. Dissolved metals

exceedances were detected in all monitoring wells and included magnesium, manganese, and sodium. These metals are considered naturally occurring and are likely related to the close proximity of the Harlem River and are not considered contaminants of concern for this Site. Barium was detected in all the groundwater samples collected during the RI, but only exceeded the AWQS in MW-111 and may be related to the petroleum impacts detected at this location, as barium is used in fuel additives.

Soil Vapor

Petroleum-related VOCs and Chlorinated VOCs were detected in all of the soil vapor samples collected on-Site. Both the former on-Site auto wrecking operations and the off-Site filling station could be a potential source for the petroleum related soil vapor impacts. Elevated levels of chlorinated VOCs were primarily located on the western portion of the Site and may be attributable to the fill material of an unknown origin placed on Site between 1951 and 1968. No other on- or off-Site sources were identified. The highest concentrations of chlorinated VOCs were detected in the western area of the Site near the Site boundary at SV-103, and included cis-1,2-Dichloroethene, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride. PCE and TCE are typical degreasers used for cleaning metal parts and could be related to the past on-Site and/or off-Site auto wrecking or service operations. PCE is also used as a dry-cleaning solvent that may have been used by off-Site former carpet cleaning facilities identified on the south adjacent properties and/or the laundry and cleaners. TCE is also formed in the environment as a breakdown product of PCE, along with cis-1,2-Dichloroethene and vinyl chloride.

The highest concentrations of petroleum-related VOCs were detected in the center and eastern areas of the Site. The highest concentrations of VOCs in soil vapor were detected in SV-101, and included Cyclohexane, n-heptane (C7), and n-Hexane (C6). This sample was collected near soil boring location SB-111, which has overall the most impacted soils. Cyclohexane is associated with use as a solvent, it is a component of petroleum and was historically used as a pesticide. Heptane is typically associated with use as a fuel additive, it is also used in paints and coatings, and it is a solvent for cleaning and degreasing. The soil vapor detections may be potentially attributable to the former auto wrecking operations that occurred historically during 1924 to 1954 or to the fill

material of an unknown origin placed on Site between 1951 and 1968 or to the off-site filling station. No other on- or off-site sources were identified. The concentrations of VOCs in soil vapor indicate that soil vapor intrusion (SVI) could impact future buildings if an environmental remedy is not implemented.

A SRI was performed within the sidewalks adjacent to the Site in November 2018 as requested by NYSDEC to inform the Qualitative Human Health Exposure Assessment, specifically whether chlorinated VOC soil vapor contamination may be emanating from an on-site and/or an off-site source. Results are detailed in a SRIR (Appendix A of the RIR) and summarized throughout this RAWP. A total of three soil vapor samples and one duplicate sample were collected to evaluate off-Site soil vapor conditions in the area of SV-103. The points were located off-site, in the adjacent sidewalk to the north (SV-103A), to the west (SV-103B) and to the south (SV-103C) of SV-103. Consistent with the sample results from SV-103, chlorinated VOCs were elevated compared to the majority of soil vapor samples collected on-site, though overall detections of PCE and TCE were lower than the detections in SV-103. Potential on- and off-site sources are the same as those identified for SV-103.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated May 14, 2019, are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, SVI into buildings at a site.

2.5 Remaining Contamination

The following section provides a summary of contamination remaining at the Site after remediation was completed.

2.5.1 Soil

The RA included excavation and off-site disposal of the upper two feet of soil across the entire Site. Based on waste manifests and waste disposal facility weigh tickets the following material was transported and disposed of off-site. A total of 69 cubic yards (CY) of lead impacted historic fill material was disposed of as hazardous waste. Disposal quantities and facilities are summarized below.

Facility	Address	Material	Quantity
Freemansburg Road Facility	1600 Freemansburg Ave Bethlehem, PA 18020	Asphalt / Concrete	~940 CY
Freemansburg Road Facility	1600 Freemansburg Ave Bethlehem, PA 18020	Soil / Fill	~11,140 CY
Max Environmental Technologies, Inc.	233 Max Lane Yukon, PA	Lead Impacted Material (Hazardous)	~ 69 CY

Two hot-spot excavations were completed as follows to address VOC concerns in soil:

- A 32 X 35 X 8-foot-deep (water table) excavation with a 1:1 slope was performed to address petroleum-related VOC impacts in groundwater in the SB-111 location. To provide additional polishing for soil that could not be excavated from beneath the water table, one 80-pound application of ORC-A (Oxygen Releasing Compound- Advanced) took place in the open excavation prior to backfilling with clean soil.
- A 40 X 30 X 7-foot-deep excavation was completed to address potential sources of soil vapor detections in the SV-103 location.

Post-excavation samples were collected from both of these hot-spot excavations.

Soils exceeding the Part 375 Unrestricted Use, Restricted Residential and Protection of Groundwater SCOs are present on-site. Exposure to remaining contamination at the Site is prevented by a composite cover system placed over the Site. This cover system is comprised of the concrete building slab underlain by a vapor barrier, and a minimum 2-foot thickness of imported clean fill over the balance of the Site. The demarcation layer, consisting of geotextile fabric beneath all excavated areas, and the vapor barrier beneath the building slab, provides a visual reference to the top of remaining contamination.

Tables 3a, 3b, and 3c, and Fig. 7 summarize the results of all soil samples collected that exceed the Unrestricted Use SCOs and the Restricted Residential Use SCOs at the Site after completion of the remedial action.

2.5.2 Groundwater

Samples collected during the RI from sample location SB-111/MW-111, exhibited petroleum-related compounds in groundwater. Soil excavation was completed in the area of SB-111 to remove potential source material contributing to elevated groundwater contaminant concentrations at this location. Following excavation, 80 pounds of ORC-A were mixed into 100 gallons of water, applied to the open excavation and mixed into the bottom of the excavation approximately 1 foot into the water table. Excavation and ORC-A application completed during the RA likely have reduced the groundwater concentrations.

Table 4 and Fig. 8 summarize the results of all samples of groundwater that exceeded the SCGs prior to completion of the remedial action.

2.5.3 Soil Vapor

Soil excavation was completed in the area of SV-103 to remove potential source material contributing to elevated soil vapor detections at this location. While excavation and groundwater treatment activities completed during the RA may have reduced soil vapor concentrations, residual contamination could contribute to SVI for the planned future development. A vapor barrier, passive sub-slab depressurization piping, and sub-slab soil vapor monitoring points were installed beneath the building slab as engineering controls to monitor and address SVI.

Table 5 and Fig. 9 summarize the results of all historical samples of soil vapor that exceeded the SCGs prior to completion of the remedial action. An SVI evaluation will be performed once the new building construction is completed. The SVI evaluation is discussed further in Section 4.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the Site, ICs/ECs are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the Site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

This plan provides:

- A description of all IC/ECs on the Site.
- The basic implementation and intended role of each IC/EC.
- A description of the key components of the ICs set forth in the Environmental Easement.
- A description of the controls to be evaluated during each required inspection and periodic review.
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the EWP (as provided in Appendix D) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site.
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the Site remedy, as determined by the NYSDEC project manager.

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the Site to Restricted Residential and Commercial uses only. Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on the survey attached to the Environmental Easement (Appendix A). These ICs are:

- The property may be used for: Restricted Residential and Commercial use.
- All ECs must be operated and maintained as specified in this SMP.

- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Environmental Protection to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- An SVI evaluation must be performed as defined in this SMP.
- Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP.
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP.
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP.
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on the survey attached to the Environmental Easement (Appendix A), , and any potential impacts that are identified must be monitored or mitigated.
- Vegetable gardens and farming on the Site are prohibited.
- An evaluation shall be performed to determine the need for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible.

3.3 Engineering Controls

3.3.1 Cover System

Exposure to remaining contamination at the Site is prevented by a cover system placed over the Site. This cover system is comprised of a minimum of 24 inches of clean, imported Item 4 stone, concrete building slabs, and vapor barrier. Fig 10 presents the location of the cover system and applicable demarcation layers. Fig 11 presents the Cover System Details.

The EWP provided in Appendix D outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Construction Health and Safety Plan (CHASP) and associated Community Air Monitoring Plan (CAMP) prepared for the Site and provided in Appendix E.

Any breach of the Site's cover system must be overseen by a PE who is licensed and registered in NYS or a qualified person who directly reports to a PE who is licensed and registered in NYS.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the RAOs identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the Site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

The remedial party will also conduct any needed Site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees, and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the Site.

3.3.2.1 –Cover System

The cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC project manager. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of Site management for the Site are included in the Quality Assurance Project Plan provided in Appendix F.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., indoor air, ambient air, and soil vapor).
- Assessing compliance with NYSDOH Guidance for Evaluating SVI in the State of New York.
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol, and frequency.
- Information on all designed monitoring systems.
- Analytical sampling program requirements.
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site-Wide Inspection

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e., no snow cover). Site-wide inspections will be performed by a qualified person who directly reports to a PE who is licensed and registered in NYS. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs

or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix G – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage.
- An evaluation of the condition and continued effectiveness of ECs.
- General Site conditions at the time of the inspection.
- Whether stormwater management systems, such as basins and outfalls, are working as designed.
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection.
- Confirm that Site records are up to date.

Inspections of all remedial components installed at the Site will be conducted. A comprehensive Site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report (PRR). The inspections will determine and document the following:

- Whether ECs continue to perform as designed.
- If these controls continue to be protective of human health and the environment.
- Compliance with requirements of this SMP and the Environmental Easement.
- Achievement of remedial performance criteria.
- If Site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, verbal notice to the NYSDEC project manager must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the Site by a qualified environmental professional, as defined in 6 NYCCR Part 375. Written confirmation must be provided to the NYSDEC project manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

The remedial party will submit follow-up status reports to the NYSDEC within 45 days of the event on actions taken to respond to any emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness of the ECs.

4.3 Post-Remediation Media Sampling

Samples shall be collected from the sub-slab soil vapor, and indoor air to evaluate the effectiveness of the remedy. Sampling locations, required analytical parameters, and schedule are provided in Table 6 – Post Remediation Sampling Requirements and Schedule below. If additional sampling is warranted based on evaluation of the results, the schedule will be modified. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Table 6. Post Remediation Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters**			**Schedule**
			VOC (EPA Method TO-15)	
Sub-slab Vapor Sample Points (SV-01 through SV-11			X	Minimum 2 weeks after completion of the building envelope construction
Indoor and Ambient Air Samples			X	In conjunction with sub-slab vapor sampling event

Detailed sample collection and analytical procedures and protocols are provided below and are further described in Appendix H – Field Activities Plan and Appendix F – Quality Assurance Project Plan.

4.3.1 Soil Vapor Intrusion Evaluation Sampling

SVI evaluation sampling will be performed to assess the performance of the remedy. The Soil Vapor Intrusion Evaluation will be completed after building construction is finished, HVAC systems up and running and prior to occupation. Sub-slab and indoor air sampling will be conducted, and the results compared to the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 with revisions) Decision*

Matrices A-F. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

The network of on-site SVI sample locations has been designed based on the following criteria:

Sub-slab soil vapor sampling points were installed in the commercial spaces and the lobby area of the building footprint. A total of 11 soil vapor sampling points were installed in accordance with the NYSDOH Guidance for SVI Evaluations in NYS (October 2006). Indoor air and outdoor ambient air samples will be collected in conjunction with the sub-slab vapor samples. Indoor air samples will be co-located with sub-slab vapor samples. Fig. 12 shows the locations of the sub-slab soil vapor points installed at the Site. Fig. 13 shows the sub-slab vapor sample point details.

The sample points are installed to allow collection of soil vapor samples from beneath the vapor barrier that underlies the bottom of the foundation slab. All sub-slab soil vapor samples will be analyzed for TO-15 at an ELAP-certified laboratory. Appendix I provides the minimum reporting limits achievable by the proposed laboratory at the time of this writing. Following evaluation of the SVI sample results, additional actions (i.e., continued SVI monitoring), if necessary, will be determined in consultation with NYSDEC.

Piping for a passive sub-slab depressurization system (SSDS) and a vapor barrier were installed beneath the slab-on-grade. Results of the SVI evaluation will determine if completion and activation of the SSDS is warranted.

If the SVI sample data indicates activation of the SSDS is warranted, this SMP will be amended to include procedures for operating and maintaining the SSDS system, to be documented in an Operation and Maintenance Plan (Section 5.0 of this SMP). The amended SMP would also include criteria for completion of remediation and termination of the SSDS. As-built drawings and details of the installed SSD piping array, signed and sealed by a PE who is licensed and registered in NYS, are shown on Fig 12 and 13.

The sampling frequency may only be modified with the approval of the NYSDEC project manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC project manager.

Deliverables for the SVI evaluation sampling program are specified in Section 7.0 – Reporting Requirements.

4.3.2 Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix G - Site Management Forms. Other observations (e.g., sub-slab vapor sample point integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the Site-specific Field Activities Plan provided as Appendix H of this document.

5.0 OPERATION AND MAINTENANCE PLAN

At this time, the Site remedy does not rely on any mechanical systems, such as groundwater treatment systems, SSDSs or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP. However, as described above, in the event that SVI evaluation sampling indicates that completion and activation of the passive SSDS is warranted, this SMP will be modified to include operation, monitoring, and maintenance procedures.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given Site and associated remedial systems. Vulnerability assessments provide information so that the Site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

The Site is not subject to significant erosion as the remedy includes a cover system consisting of the building, paved and concreted areas, and limited landscaped areas.

The Harlem riverfront on the adjacent parcel is stabilized by a rip-rap shoreline and existing trees and vegetation, which will remain in place.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

Future assessments would include, but not be limited to, a discussion of potential vulnerabilities to be assessed during periodic reviews such as the following:

- **Flood Plain:** The Site is adjacent to the Harlem River. A portion of the Site lies within the Federal Emergency Management Agency (FEMA) Special Flood Hazard Area Zone AE and the remainder lies within Zone X. Future assessments should confirm FEMA designations and report any changes to designated flood zones.
- **Site Drainage and Storm Water Management:** Areas of the site which have been observed to flood during severe rain events due to insufficient groundwater recharge capabilities or inadequate storm water management systems will be reported.
- **Erosion:** Any evidence of erosion at the site or areas of the site which may be susceptible to erosion during periods of severe rain events will be reported.

- **High Wind:** Areas of the site which may be susceptible to damage from the wind itself or falling objects, such as trees or utility structures during periods of high wind will be reported.
- **Electricity:** The Site remedy is passive and does not require electricity to operate. If the SSDS is activated in the future, susceptibility of the site/remedial system to power loss and/or dips/surges in voltage during severe weather events, including lightning strikes, and the associated impact on site equipment and operations will be evaluated.
- **Spill/Contaminant Release:** The Site remedy is passive and generates no waste. Spill/contaminant releases are not applicable.

Photographs of any vulnerable areas identified at the site would be provided as part of the future assessment.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including Site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the Periodic Review Report (PRR).

The Site remedy is a passive cover system, which generates no waste, uses no resources after installation, creates no emissions, and maintains the current footprint of the Site.

In the event the SSDS is activated, this SMP will be amended to include additional details regarding Green Remediation Evaluations including timing of evaluations, frequency of system checks, metrics and reporting, and system optimization.

This assessment would include, but not be limited to, a discussion of items listed below, in relation to the implementation and operation and maintenance of the selected remedy. Where appropriate, quantification of these items would be provided:

- Waste Generation (describe the management of waste associated with the site and any waste reduction projects implemented, including, but not limited to, material reuse and recycling). There is currently no waste generated from the

passive site cover. If the SSDS required activation, waste generation would be detailed in the PRR.

- Energy usage (electrical usage for operation of remedial systems, site lighting, security systems, etc.). There is currently no electrical use from remedial systems. If the SSDS required activation, energy usage would be described in the PPR.
- Emissions (vapor-phase remedial system emissions, fuel usage for transportation to and from the site for inspections and/or sampling, operation of gas-powered generators, etc.). There are currently no emissions from remedial systems. If the SSDS required activation, emissions would be reported in the PRR. Minimal vehicle use is anticipated for the annual site inspection and one day of field effort to conduct SVI sampling. Sample equipment for the SVI sampling task is battery operated and produces no emissions.
- Water usage (identify sources of decontamination water, irrigation water, etc.). Note that while infiltration systems for runoff may be appropriate green technologies for some sites, elevated protection of groundwater SCOs may indicate a need to minimize infiltration in certain areas and/or at certain sites. There is currently no remedial system is operating on the Site, and no water is generated from remedial systems.
- Land and/or ecosystems (describe any disturbances and restoration of land and/or ecosystems as part of implementation/operation of the remedy). The site cover is a minimum of 24-inches of clean imported Item 4 stone, the building footprint, and vapor barrier. Any future additions the site cover would be discussed in the PRR.

Methods proposed to reduce energy consumption, resource usage, waste generation, water usage, etc. would be included in the PRR.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC project manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

There are no active remedial systems on the Site. In the event that the SSDS requires activation, this SMP will be modified to include RSO requirements.

6.2.2 Building Operations

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

There are no active remedial systems on the Site. In the event that the SSDS requires activation, this SMP will be modified to include operation efficiency procedures.

Components to be evaluated if the SSDS requires activation should include, but are not limited to:

- Heating/cooling systems and temperature set-points;
- Building skin, insulation and building use and occupancy;
- Ventilation;
- Lighting and plug loads; and
- Grounds and property management.

6.2.3 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources. An SVI evaluation is planned for the Site. Following evaluation of the SVI sample results, additional actions (i.e., continued SVI monitoring), if necessary, will be determined in consultation with NYSDEC.

There are no active remedial systems on the Site. In the event that the SSDS requires activation, this SMP will be modified to include system check requirements and schedule efficiency for sampling and other periodic activities. Frequency of sampling, system checks, and site visits will be determined in coordination with NYSDEC and NYSDOH requirements. Where possible, remote system monitoring and telemetry will be utilized to provide system data and alerts in lieu of static scheduled Site visits. When

possible, system maintenance and checks will be performed in conjunction with Site visits for periodic inspections and/or required sampling events.

6.2.4 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix G – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All Site management inspection, maintenance and monitoring events will be recorded on the appropriate Site management forms provided in Appendix G, following the Responsibilities of Owner and Remedial Parties provided in Appendix J, and any applicable permits or permit equivalents (Appendix K). These forms are subject to NYSDEC revision. All Site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in NYS, or a qualified person who directly reports to a PE who is licensed and registered in NYS.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 7 and summarized in the PRR.

Table 7. Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Soil Vapor Intrusion Evaluation Report	45 days after sample event
Periodic Review Report	First report 16 months after issuance of COC and annually for the next year, every third year thereafter, or as otherwise determined by the NYSDEC

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC project manager.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period.
- Name, company, and position of person(s) conducting monitoring/inspection activities.
- Description of the activities performed.
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet).
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air).
- Copies of all field forms completed (e.g., sub-slab soil vapor sampling logs, chain-of-custody documentation).
- Sampling results in comparison to appropriate standards/criteria.
- A figure illustrating sample type and sampling locations.
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format).
- Any observations, conclusions, or recommendations.
- A determination as to whether contaminant conditions have changed since the last reporting event.
- Routine maintenance event reporting forms will include, at a minimum:
- Date of event.
- Name, company, and position of person(s) conducting maintenance activities.
- Description of maintenance activities performed.
- Any modifications to the system.
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).
- Non-routine maintenance event reporting forms will include, at a minimum:
- Date of event.
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities.
- Description of non-routine activities performed.

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet).
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuISTM database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A PRR will be submitted to the NYSDEC project manager beginning 16 months after the COC is issued. After submittal of the initial PRR, the next PRR shall be submitted annually for the first year and every third year afterwards to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. In the event that the Site is subdivided into separate parcels with different ownership, a single PRR Report will be prepared that addresses the Site described in Appendix A - Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site.
- Results of the required Site inspections, fire inspections and severe condition inspections, if applicable.
- Description of any change of use, import of materials, or excavation that occurred during the certifying period.
- All applicable Site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.

- Data summary tables and graphical representations of contaminants of concern by media (soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data.
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis.
  - O&M data summary tables.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A Site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the Site-specific Remedial Action Work Plan (RAWP), ROD or Decision Document.
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications.
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored.
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan.
  - An update to the climate change vulnerability assessment if site or external conditions have changed since the previous assessment, and recommendations to address vulnerabilities.
  - An update to the climate change screening to determine if the remedy remains resilient to projected changes in climate hazards.
  - A summary of the Green Remediation evaluation, including a quantitative and qualitative overview of a site's environmental impacts and recommendations to improve the remedy's environmental footprint. The PRR will include the completed Summary of Green Remediation Metrics form provided in Appendix G.
  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP, ROD or Decision Document.

– The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional as defined in 6 NYCRR Part 375 or PE licensed to practice and registered in NYS will prepare, and include in the PRR, the following certification as per the requirements of NYSDEC DER-10:

"For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- *The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any SMP for this control;*
- *Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the Site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*
- *No new information has come to my attention, including groundwater monitoring data from wells located at the Site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*
- *The assumptions made in the qualitative exposure assessment remain valid.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of GEI Consultants, Inc., 1000 New York Avenue, Suite B, Huntington Station, New York, am certifying as Owner's/Remedial Party's Designated Site Representative

"I certify that the NYS Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report."

The signed certification will be included in the PRR.

The PRR will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The PRR may also need to be submitted in hard-copy format if requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control or failure to conduct Site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

8.0 REFERENCES

AKRF, Phase I Environmental Site Assessment (ESA) – 3875 9th Avenue Block 2188, Lots 1 and 10, September 2014.

AKRF, Subsurface (Phase II) Investigation, 3875 Ninth Avenue, October 2014.

GEI Consultants, Inc., P.C., Remedial Investigation Report, September 25, 2018.

GEI Consultants, Inc., P.C., Remedial Action Work Plan, February 18, 2019.

6 NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC Decision Document, 207th Street / 9th Avenue, May 2019.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Roux Associates, Inc., Remedial Investigation Work Plan, May 22, 2017.

TABLES

Table 2. Groundwater Elevation Measurements
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

		Date: 5/23/18 08:15 (Mid Tide)		Date: 11/9/18 10:30 (High Tide)		Date: 11/9/18 16:30 (Low Tide)	
Well ID	**Top of Casing Elevation (ft. amsl)**	**Depth to water**	**Groundwater Elevation (ft. amsl)**	**Depth to water**	**Groundwater Elevation (ft. amsl)**	**Depth to water**	**Groundwater Elevation (ft. amsl)**
MW-103	10.99	9.68	1.31	9.19	1.8	10.38	0.61
MW-104	11.58	10.17	1.41	9.73	1.85	10.89	0.69
MW-105	9.15	6.97	2.18	6.92	2.23	6.75	2.4
MW-109R	7.95	5.89	2.06	4.6	3.35	5.74	2.21
MW-111	8.74	7.16	1.58	6.79	1.95	7.5	1.24

Table 3a. Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

	LOCATION						EP-SV103-N		EP-SV103-E		EP-SV103-S		EP-SV103-W		EP-SV103-W DUP		EP-SB111-N		EP-SB111-E		EP-SB111-S		EP-SB111-W	
	SAMPLING DATE						8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019	
	LAB SAMPLE ID						L1934689-01		L1934689-02		L1934689-03		L1934689-04		L1934689-09		L1934689-05		L1934689-06		L1934689-07		L1934689-08	
	SAMPLE TYPE						SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	SAMPLE DEPTH (ft.)						5-7		5-7		5-7		5-7		5-7		6-8		6-8		6-8		6-8	
		Units	CasNum	Unrestricted SCO	Protection of Groundwater SCO	Restricted-Residential SCO	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Semivolatile Organics by GC/MS		mg/kg																						
	Acenaphthene		83-32-9	***20***	98	100	**0.035**	J	0.16	U	0.15	U	0.16	U	0.16	U	**0.15**		**0.24**		**0.028**	J	**0.31**	
	1,2,4-Trichlorobenzene		120-82-1				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Hexachlorobenzene		118-74-1	***0.33***	3.2	1.2	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.11	U	0.11	U	0.12	U	0.11	U
	Bis(2-chloroethyl)ether		111-44-4				0.18	U	0.18	U	0.17	U	0.18	U	0.19	U	0.17	U	0.17	U	0.17	U	0.17	U
	2-Chloronaphthalene		91-58-7				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	1,2-Dichlorobenzene		95-50-1	***1.1***	1.1	100	0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	1,3-Dichlorobenzene		541-73-1	***2.4***	2.4	49	0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	1,4-Dichlorobenzene		106-46-7	***1.8***	1.8	13	0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	3,3'-Dichlorobenzidine		91-94-1				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2,4-Dinitrotoluene		121-14-2				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2,6-Dinitrotoluene		606-20-2				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Fluoranthene		206-44-0	***100***	1000	100	**0.76**		**0.026**	J	**0.22**		**0.029**	J	0.12	U	**1.7**		**2.3**		**0.54**		**2.6**	
	4-Chlorophenyl phenyl ether		7005-72-3				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	4-Bromophenyl phenyl ether		101-55-3				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Bis(2-chloroisopropyl)ether		108-60-1				0.23	U	0.25	U	0.23	U	0.24	U	0.25	U	0.23	U	0.23	U	0.23	U	0.22	U
	Bis(2-chloroethoxy)methane		111-91-1				0.21	U	0.22	U	0.21	U	0.21	U	0.22	U	0.21	U	0.21	U	0.21	U	0.2	U
	Hexachlorobutadiene		87-68-3				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Hexachlorocyclopentadiene		77-47-4				0.56	U	0.59	U	R		0.56	U	0.59	U	0.55	U	0.55	U	0.55	U	0.53	U
	Hexachloroethane		67-72-1				0.16	U	0.16	U	0.15	U	0.16	U	0.16	U	0.15	U	0.15	U	0.15	U	0.15	U
	Isophorone		78-59-1				0.18	U	0.18	U	0.17	U	0.18	U	0.19	U	0.17	U	0.17	U	0.17	U	0.17	U
	Naphthalene		91-20-3	***12***	12	100	0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	**0.24**		**0.26**		**0.096**	J	**0.46**	
	Nitrobenzene		98-95-3				0.18	U	0.18	U	0.17	U	0.18	U	0.19	U	0.17	U	0.17	U	0.17	U	0.17	U
	NDPA/DPA		86-30-6				0.16	U	0.16	U	0.15	U	0.16	U	0.16	U	0.15	U	0.15	U	0.15	U	0.15	U
	n-Nitrosodi-n-propylamine		621-64-7				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Bis(2-ethylhexyl)phthalate		117-81-7				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	**0.59**		**0.16**	J	**0.33**		**0.81**	
	Butyl benzyl phthalate		85-68-7				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Di-n-butylphthalate		84-74-2				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	**0.21**	
	Di-n-octylphthalate		117-84-0				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Diethyl phthalate		84-66-2				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Dimethyl phthalate		131-11-3				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Benzo(a)anthracene		56-55-3	***1***	1	1	**0.37**		0.12	U	**0.12**		**0.023**	J	0.12	U	**0.85**		***1***		**0.41**		***1.5***	
	Benzo(a)pyrene		50-32-8	***1***	22	1	**0.34**		0.16	U	**0.11**	J	0.16	U	0.16	U	**0.72**		**0.82**		**0.28**		***1.3***	
	Benzo(b)fluoranthene		205-99-2	***1***	1.7	1	**0.46**		0.12	U	**0.17**		0.12	U	0.12	U	**0.89**		***1.1***		**0.44**		***1.2***	
	Benzo(k)fluoranthene		207-08-9	***0.8***	1.7	3.9	**0.12**		0.12	U	**0.05**	J	0.12	U	0.12	U	**0.32**		**0.26**		**0.14**		***1.2***	
	Chrysene		218-01-9	***1***	1	3.9	**0.33**		0.12	U	**0.12**		0.12	U	0.12	U	**0.73**		**0.86**		**0.38**		***1.2***	
	Acenaphthylene		208-96-8	***100***	107	100	**0.062**	J	0.16	U	**0.047**	J	0.16	U	0.16	U	**0.13**	J	**0.21**		**0.22**		**0.21**	
	Anthracene		120-12-7	***100***	1000	100	**0.12**		0.12	U	0.12	U	0.12	U	0.12	U	**0.38**		**0.6**		**0.14**		**0.6**	
	Benzo(ghi)perylene		191-24-2	***100***	1000	100	**0.25**		0.16	U	0.11	J	0.16	U	0.16	U	**0.52**		**0.59**		**0.26**		**1.2**	
	Fluorene		86-73-7	***30***	386	100	**0.042**	J	0.2	U	0.19	U	0.2	U	0.21	U	**0.19**		**0.47**		**0.061**	J	**0.38**	
	Phenanthrene		85-01-8	***100***	1000	100	**0.51**		0.12	U	**0.089**	J	0.12	U	0.12	U	**1.2**		**2**		**0.28**		**1.8**	
	Dibenzo(a,h)anthracene		53-70-3	***0.33***	1000	0.33	**0.056**	J	0.12	U	**0.022**	J	0.12	U	0.12	U	**0.11**		**0.14**		**0.07**	J	**0.24**	
	Indeno(1,2,3-cd)pyrene		193-39-5	***0.5***	8.2	0.5	**0.26**		0.16	U	**0.1**	J	0.16	U	0.16	U	***0.55***		***0.64***		**0.27**		***1.1***	
	Pyrene		129-00-0	***100***	1000	100	**0.66**		**0.027**	J	**0.19**		**0.026**	J	0.12	U	**1.5**		**1.9**		**0.75**		**2.5**	
	Biphenyl		92-52-4				0.44	U	0.47	U	0.44	U	0.45	U	0.47	U	0.44	U	0.44	U	0.44	U	**0.052**	J
	4-Chloroaniline		106-47-8				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2-Nitroaniline		88-74-4				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	3-Nitroaniline		99-09-2				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	4-Nitroaniline		100-01-6				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Dibenzofuran		132-64-9	***7***	210	59	**0.023**	J	0.2	U	0.19	U	0.2	U	0.21	U	**0.086**	J	**0.17**	J	**0.033**	J	**0.18**	
	2-Methylnaphthalene		91-57-6				0.23	U	0.25	U	0.23	U	0.24	U	0.25	U	**0.22**	J	**0.092**	J	**0.084**	J	**0.46**	
	1,2,4,5-Tetrachlorobenzene		95-94-3				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Acetophenone		98-86-2				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2,4,6-Trichlorophenol		88-06-2				0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.11	U	0.11	U	0.12	U	0.11	U
	p-Chloro-m-cresol		59-50-7				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2-Chlorophenol		95-57-8				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2,4-Dichlorophenol		120-83-2				0.18	U	0.18	U	0.17	U	0.18	U	0.19	U	0.17	U	0.17	U	0.17	U	0.17	U
	2,4-Dimethylphenol		105-67-9				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	2-Nitrophenol		88-75-5				0.42	U	0.44	U	0.42	U	0.43	U	0.45	U	0.41	U	0.41	U	0.41	U	0.4	U
	4-Nitrophenol		100-02-7				0.27	U	0.29	U	0.27	U	0.28	U	0.29	U	0.27	U	0.27	U	0.27	U	0.26	U
	2,4-Dinitrophenol		51-28-5				0.93	U	0.99	U	R		0.95	U	0.99	U	0.92	U	0.92	U	0.92	U	0.89	U

Table 3a. Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

LOCATION						EP-SV103-N		EP-SV103-E		EP-SV103-S		EP-SV103-W		EP-SV103-W DUP		EP-SB111-N		EP-SB111-E		EP-SB111-S		EP-SB111-W	
SAMPLING DATE						8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019	
LAB SAMPLE ID						L1934689-01		L1934689-02		L1934689-03		L1934689-04		L1934689-09		L1934689-05		L1934689-06		L1934689-07		L1934689-08	
SAMPLE TYPE						SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE DEPTH (ft.)						5-7		5-7		5-7		5-7		5-7		6-8		6-8		6-8		6-8	
		Units	CasNum	Unrestricted SCO	Protection of Groundwater SCO	Restricted-Residential SCO	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
	4,6-Dinitro-o-cresol		534-52-1				0.5	U	0.54	U	R		0.51	U	0.54	U	0.5	U	0.5	U	0.5	U	0.48	U
	Pentachlorophenol		87-86-5	***0.8***	0.8	6.7	0.16	U	0.16	U	0.15	U	0.16	U	0.16	U	0.15	U	0.15	U	0.15	U	0.15	U
	Phenol		108-95-2	***0.33***	0.33	100	0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	**0.037**	J
	2-Methylphenol		95-48-7	***0.33***	0.33	100	0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	3-Methylphenol/4-Methylphenol		108-39-4/106-44-5	***0.33***	0.33	100	0.28	U	0.3	U	0.28	U	0.28	U	0.3	U	**0.038**	J	**0.043**	J	0.28	U	0.12	J
	2,4,5-Trichlorophenol		95-95-4				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Benzoic Acid		65-85-0				0.63	U	0.67	U	0.62	U	0.64	U	0.67	U	0.62	U	0.62	U	0.62	U	0.6	U
	Benzyl Alcohol		100-51-6				0.19	U	0.2	U	0.19	U	0.2	U	0.21	U	0.19	U	0.19	U	0.19	U	0.18	U
	Carbazole		86-74-8				**0.057**	J	0.2	U	0.19	U	0.2	U	0.21	U	**0.15**	J	**0.14**	J	**0.036**	J	**0.22**	
	1,4-Dioxane		123-91-1	***0.1***	0.1	13	0.029	U	0.031	U	0.029	U	0.03	U	0.031	U	0.029	U	0.029	U	0.029	U	0.028	U
Total Metals		mg/kg																						
	Aluminum, Total		7429-90-5				**9500**		**11100**		**7880**		**9410**		**11000**		**11700**		**11500**		**12100**		**8150**	
	Antimony, Total		7440-36-0				0.0046	U	4.7	U	0.00455	U	4.55	U	0.00474	U	0.00449	U	0.00454	U	0.00447	U	**41.2**	
	Arsenic, Total		7440-38-2	***13***	16	16	**3.89**		**3.26**		**2.88**		**3.08**		**3.58**		**3.16**		**3.84**		**3.51**		**11.4**	
	Barium, Total		7440-39-3	***350***	820	400	**64.7**		**66.8**		**51.3**		**59.9**		**69.3**		**97.2**		**149**		**132**		**225**	
	Beryllium, Total		7440-41-7	***7.2***	47	72	**0.295**	J	**0.452**	J	**0.291**	J	**0.391**	J	**0.465**	J	**0.323**	J	**0.272**	J	**0.232**	J	**0.288**	J
	Cadmium, Total		7440-43-9	***2.5***	7.5	4.3	**0.212**	J	**0.094**	J	**0.182**	J	**0.2**	J	**0.095**	J	**0.575**	J	**1.88**		**0.67**	J	***5.23***	
	Calcium, Total		7440-70-2				**8900**		**3020**		**8700**		**2830**	J	**1640**	J	**3710**		**7760**		**6490**		**9770**	
	Chromium, Total		7440-47-3				**14.9**		**12.9**		**11.2**		**14.2**		**13**		**32.4**		**27.6**		**49.8**		**25**	
	Cobalt, Total		7440-48-4				**5.97**		**6**		**5.26**		**5.78**		**5.6**		**9.13**		**7.89**		**11.3**		**7.69**	
	Copper, Total		7440-50-8	***50***	1720	270	**23.6**		**11.5**		**23**		**13.5**		**9.92**		**29**		**43.7**		**34.3**		***208***	
	Iron, Total		7439-89-6				**14100**		**14600**		**11700**		**13200**		**14300**		**16400**		**17700**		**19800**		**24900**	
	Lead, Total		7439-92-1	***63***	450	400	**39.4**		**14.2**		**39.5**		**37.4**	J	**14.9**	J	**61.6**		***234***		**59.8**		***3480***	
	Magnesium, Total		7439-95-4				**5340**		**3290**		**4820**		**3380**		**2560**		**6830**		**5690**		**9120**		**4220**	
	Manganese, Total		7439-96-5	***1600***	2000	2000	**321**		**327**		**293**		**424**		**274**		**229**		**257**		**213**		**205**	
	Mercury, Total		7439-97-6	***0.18***	0.73	0.81	**0.057**	J	**0.071**	J	***0.181***	J	0.076	U	0.078	U	0.075	U	**0.105**		0.075	U	**0.174**	
	Nickel, Total		7440-02-0	***30***	130	310	**11.9**		**11**		**10.3**		**11.4**		**10.8**		**28.1**		**24.4**		***37.3***		***59.8***	
	Potassium, Total		7440-09-7				**1340**		**688**		**971**		**751**		**645**		**2020**		**2070**		2650		1650	
	Selenium, Total		7782-49-2	***3.9***	4	180	1.84	U	1.88	U	1.82	U	1.82	U	1.9	U	0.593	J	1.82	U	1.79	U	0.678	J
	Silver, Total		7440-22-4	***2***	8.3	180	0.922	U	0.941	U	0.91	U	0.91	U	0.949	U	0.898	U	0.908	U	0.894	U	0.254	J
	Sodium, Total		7440-23-5				**248**		**183**	J	**248**		**89.6**	J	**170**	J	**298**		**355**		603		281	
	Thallium, Total		7440-28-0				1.84	U	1.88	U	1.82	U	1.82	U	1.9	U	1.8	U	1.82	U	1.79	U	1.69	U
	Vanadium, Total		7440-62-2				**23.5**		**17.4**		**19.6**		**18.2**		**16.2**		**41.4**		**33.5**		56.4		36.8	
	Zinc, Total		7440-66-6	***109***	2480	10000	**64.7**		**35.9**		**52.6**		**37.7**		**35.5**		***132***		***351***		***126***		***753***	
Volatile Organics by EPA 5035		mg/kg																						
	Methylene chloride		75-09-2	***0.05***	0.05	100	0.0054	U	0.0057	U	0.27	U	0.0056	U	0.0056	U	0.28	U	0.28	U	0.0052	U	0.33	U
	1,1-Dichloroethane		75-34-3	***0.27***	0.27	26	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	Chloroform		67-66-3	***0.37***	0.37	49	0.0016	U	0.0017	U	0.01	J	0.0017	U	0.0017	U	0.084	U	0.085	U	0.0016	U	0.098	U
	Carbon tetrachloride		56-23-5	***0.76***	0.76	2.4	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	1,2-Dichloropropane		78-87-5				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	Dibromochloromethane		124-48-1				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	1,1,2-Trichloroethane		79-00-5				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	Tetrachloroethene		127-18-4	***1.3***	1.3	19	**0.77**	J	**0.013**		***3.4***		**0.013**	J	**0.023**	J	0.028	U	0.028	U	**0.0005**	J	0.033	U
	Chlorobenzene		108-90-7	***1.1***	1.1	100	0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	Trichlorofluoromethane		75-69-4				0.0043	U	0.0045	U	0.21	U	0.0045	U	0.0045	U	0.22	U	0.23	U	0.0042	U	0.26	U
	1,2-Dichloroethane		107-06-2	***0.02***	0.02	3.1	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	1,1,1-Trichloroethane		71-55-6	***0.68***	0.68	100	0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	Bromodichloromethane		75-27-4				0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	trans-1,3-Dichloropropene		10061-02-6				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	cis-1,3-Dichloropropene		10061-01-5				0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	1,3-Dichloropropene, Total		542-75-6				0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	1,1-Dichloropropene		563-58-6				0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	Bromoform		75-25-2				0.0043	U	0.0045	U	0.21	U	0.0045	U	0.0045	U	0.22	U	0.23	U	0.0042	U	0.26	U
	1,1,2,2-Tetrachloroethane		79-34-5				0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	Benzene		71-43-2	***0.06***	0.06	4.8	0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	***0.062***		***0.17***		0.00052	U	***0.061***	
	Toluene		108-88-3	***0.7***	0.7	100	**0.00088**	J	0.0011	U	0.053	U	0.0011	U	**0.00061**	J	**0.04**	J	**0.053**	J	**0.00068**	J	**0.095**	
	Ethylbenzene		100-41-4	***1***	1	41	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.086**		**0.069**		**0.00021**	J	**0.12**	
	Chloromethane		74-87-3				0.0043	U	0.0045	U	0.21	U	0.0045	U	0.0045	U	0.22	U	0.23	U	0.0042	U	0.26	U
	Bromomethane		74-83-9				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	Vinyl chloride		75-01-4	***0.02***	0.02	0.9	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	Chloroethane		75-00-3				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U

Table 3a. Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

	LOCATION						EP-SV103-N		EP-SV103-E		EP-SV103-S		EP-SV103-W		EP-SV103-W DUP		EP-SB111-N		EP-SB111-E		EP-SB111-S		EP-SB111-W	
	SAMPLING DATE						8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019		8/2/2019	
	LAB SAMPLE ID						L1934689-01		L1934689-02		L1934689-03		L1934689-04		L1934689-09		L1934689-05		L1934689-06		L1934689-07		L1934689-08	
	SAMPLE TYPE						SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	SAMPLE DEPTH (ft.)						5-7		5-7		5-7		5-7		5-7		6-8		6-8		6-8		6-8	
		Units	CasNum	Unrestricted SCO	Protection of Groundwater SCO	Restricted-Residential SCO	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
	1,1-Dichloroethene		75-35-4	***0.33***	0.33	100	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	trans-1,2-Dichloroethene		156-60-5	***0.19***	0.19	100	**0.00051**	J	**0.00072**	J	0.08	U	**0.00058**	J	**0.00048**	J	0.084	U	0.085	U	**0.00048**	J	0.098	U
	Trichloroethene		79-01-6	***0.47***	0.47	21	***0.5***	J	**0.0064**		***0.8***		**0.0021**	J	**0.012**	J	0.028	U	0.028	U	0.00052	U	0.033	U
	1,2-Dichlorobenzene		95-50-1	***1.1***	1.1	100	0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,3-Dichlorobenzene		541-73-1	***2.4***	2.4	49	0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,4-Dichlorobenzene		106-46-7	***1.8***	1.8	13	0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	Methyl tert butyl ether		1634-04-4	***0.93***	0.93	100	**0.00046**	J	**0.00045**	J	0.11	U	**0.00043**	J	**0.00043**	J	0.11	U	0.11	U	**0.00065**	J	0.13	U
	p/m-Xylene		179601-23-1				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	**0.21**		**0.22**		0.0021	U	**0.28**	
	o-Xylene		95-47-6				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.052**	J	**0.074**		0.001	U	**0.069**	
	Xylenes, Total		1330-20-7	***0.26***	1.6	100	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.26**	J	***0.29***		0.001	U	***0.35***	
	cis-1,2-Dichloroethene		156-59-2	***0.25***	0.25	100	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	1,2-Dichloroethene, Total		540-59-0				**0.00051**	J	**0.00072**	J	0.053	U	**0.00058**	J	**0.00048**	J	0.056	U	0.057	U	**0.00048**	J	0.065	U
	Dibromomethane		74-95-3				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	Styrene		100-42-5				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	Dichlorodifluoromethane		75-71-8				0.011	U	0.011	U	0.53	U	0.011	U	0.011	U	0.56	U	0.57	U	0.01	U	0.65	U
	Acetone		67-64-1	***0.05***	0.05	100	***0.36***	J	***0.14***		0.53	U	***0.12***		***0.12***		0.56	U	0.57	U	***0.25***		0.65	U
	Carbon disulfide		75-15-0				0.011	U	0.011	U	0.53	U	0.011	U	0.011	U	0.56	U	0.57	U	0.01	U	0.65	U
	2-Butanone		78-93-3	***0.12***	0.12	100	0.011	U	0.011	U	0.53	U	0.011	U	0.011	U	0.56	U	0.57	U	0.01	U	***0.19***	J
	Vinyl acetate		108-05-4				0.011	U	0.011	U	0.53	U	0.011	U	0.011	U	0.56	U	0.57	U	0.01	U	0.65	U
	4-Methyl-2-pentanone		108-10-1				0.011	U	0.011	U	0.53	U	0.011	U	0.011	U	0.56	U	0.57	U	0.01	U	0.65	U
	1,2,3-Trichloropropane		96-18-4				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	2-Hexanone		591-78-6				0.011	U	0.011	U	0.53	U	0.011	U	0.011	U	0.56	U	0.57	U	0.01	U	0.65	U
	Bromochloromethane		74-97-5				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	2,2-Dichloropropane		594-20-7				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,2-Dibromoethane		106-93-4				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	0.056	U	0.057	U	0.001	U	0.065	U
	1,3-Dichloropropane		142-28-9				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,1,1,2-Tetrachloroethane		630-20-6				0.00054	U	0.00057	U	0.027	U	0.00056	U	0.00056	U	0.028	U	0.028	U	0.00052	U	0.033	U
	Bromobenzene		108-86-1				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	n-Butylbenzene		104-51-8	***12***	12	100	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.11**		**0.078**		**0.00017**	J	**0.065**	
	sec-Butylbenzene		135-98-8	***11***	11	100	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.046**	J	**0.034**	J	**0.00015**	J	**0.025**	J
	tert-Butylbenzene		98-06-6	***5.9***	5.9	100	0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	o-Chlorotoluene		95-49-8				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	p-Chlorotoluene		106-43-4				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,2-Dibromo-3-chloropropane		96-12-8				0.0032	U	0.0034	U	0.16	U	0.0033	U	0.0034	U	0.17	U	0.17	U	0.0031	U	0.2	U
	Hexachlorobutadiene		87-68-3				0.0043	U	0.0045	U	0.21	U	0.0045	U	0.0045	U	0.22	U	0.23	U	0.0042	U	0.26	U
	Isopropylbenzene		98-82-8				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.095**		**0.052**	J	**0.00019**	J	**0.026**	J
	p-Isopropyltoluene		99-87-6				0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.024**	J	**0.021**	J	0.001	U	**0.019**	J
	Naphthalene		91-20-3	***12***	12	100	0.0043	U	0.0045	U	**0.044**	J	0.0045	U	0.0045	U	**0.24**		**0.25**		**0.00091**	J	**0.18**	J
	Acrylonitrile		107-13-1				0.0043	U	0.0045	U	0.21	U	0.0045	U	0.0045	U	0.22	U	0.23	U	0.0042	U	0.26	U
	n-Propylbenzene		103-65-1	***3.9***	3.9	100	0.0011	U	0.0011	U	0.053	U	0.0011	U	0.0011	U	**0.24**		**0.11**		**0.00023**	J	**0.087**	
	1,2,3-Trichlorobenzene		87-61-6				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,2,4-Trichlorobenzene		120-82-1				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	1,3,5-Trimethylbenzene		108-67-8	***8.4***	8.4	52	0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	**0.073**	J	**0.062**	J	**0.00022**	J	0.061	J
	1,2,4-Trimethylbenzene		95-63-6	***3.6***	3.6	52	0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	**0.26**		**0.2**		**0.00065**	J	**0.2**	
	1,4-Dioxane		123-91-1	***0.1***	0.1	13	R		R		R		R		R		R		R		R		R	
	p-Diethylbenzene		105-05-5				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	**0.081**	J	**0.052**	J	0.0021	U	**0.052**	J
	p-Ethyltoluene		622-96-8				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	**0.16**		**0.14**		0.0021	U	**0.17**	
	1,2,4,5-Tetramethylbenzene		95-93-2				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	**0.41**		**0.31**		**0.00094**	J	**0.24**	
	Ethyl ether		60-29-7				0.0021	U	0.0023	U	0.11	U	0.0022	U	0.0022	U	0.11	U	0.11	U	0.0021	U	0.13	U
	trans-1,4-Dichloro-2-butene		110-57-6				0.0054	U	0.0057	U	0.27	U	0.0056	U	0.0056	U	0.28	U	0.28	U	0.0052	U	0.33	U

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESGW: New York NYCRR Part 375 Groundwater Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

R- The result is rejected.

Table 3a. Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

% = Percent
µg/kg = micrograms per kilogram

PCB = Polychlorinated Biphenyl
SVOC = Semi-Volatile Organic Compound
VOC = Volatile Organic Compound

6 NYCRR = New York State Register and Official Compilation of Codes, Rules and Regulations of the State of New York

Comparison of detected results are performed against one or more of the following NYCRR, Chapter IV, Part 375-6 Soil Cleanup Objectives (SCO)s: Unrestricted Use, Residential, Restricted-Residential, Commercial, Industrial, Protection of Ecological Resources, or Protection of Groundwater

CAS No. = Chemical Abstracts Service Number
NE = Not Established
NA = Not Analyzed
NYSDEC = New York State Department of Environmental Conservation

Bolding indicates a detected result concentration
Shading and bolding indicates that the detected concentration is above the NYSDEC guidance it was compared to
Gray shading and bolding indicates that the detected result value exceeds the Unrestricted SCO
Yellow shading and bolding indicates that the detected result value exceeds the Protection of Groundwater SCO
Green shading and bolding indicates that the detected result value exceeds the Restricted-Residential SCO

Data Qualifiers:
J = The result is an estimated value.
U = The result was not detected above the reporting limit.
R = The result was rejected.

Table 3b. Remedial Investigation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

Analyte	Units	CAS No.	Unrestricted SCO	Protection of Groundwater SCO	Restricted-Residential SCO	Location Name	SB-101R	SB-103	SB-104	SB-105	SB-106	SB-107	SB-108	SB-109	SB-109R	SB-110	SB-111	SB-111	SB-112
						Sample Name	SB-101R (10-12)	SB-103 (10-12)	SB-104 (10-12)	SB-105 (10-12)	SB-106 (10-12)	SB-107 (10-12)	SB-108 (10-12)	SB-109 (8-10)	SB-109R (10-12)	SB-110 (10-12)	SB-111 (10-12)	SB-111 (14-15)	SB-112 (10-12)
						Start Depth	10	10	10	10	10	10	10	8	10	10	10	14	10
						End Depth	12	12	12	12	12	12	12	10	12	12	12	15	12
						Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
						Sample Date	5/11/2018	5/8/2018	5/8/2018	5/8/2018	5/11/2018	5/4/2018	5/7/2018	5/7/2018	5/9/2018	5/11/2018	5/7/2018	5/7/2018	5/11/2018
BTEX	mg/kg																		
Benzene		71-43-2	*0.06*	0.06	4.8		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	**0.00011 J**	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.0012**	0.055 U	0.00083 U
Toluene		108-88-3	*0.7*	0.7	100		0.0013 U	0.0013 U	0.00065 U	0.0017 U	0.00071 U	**0.00011 J**	0.0009 U	0.001 U	0.0014 U	0.0015 U	0.0014 U	0.082 U	0.0012 U
Ethylbenzene		100-41-4	*1*	1	41		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.0012**	0.055 U	0.00083 U
o-Xylene		95-47-6	*0.26*	1.6	100		0.0018 U	0.0017 U	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	**0.0012 J**	0.11 U	0.0016 U
m/p-Xylene		179601-23-1	*0.26*	1.6	100		0.0018 U	0.0017 U	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	**0.0031**	0.11 U	0.0016 U
Total Xylene		1330-20-7	*0.26*	1.6	100		0.0018 U	0.0017 U	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	**0.0043 J**	0.11 U	0.0016 U
Other VOCs	mg/kg																		
Acetone		67-64-1	*0.05*	0.05	100		**0.055**	**0.068**	0.011 U	**0.065**	**0.023**	**0.031**	**0.026**	**0.017**	0.021 U	**0.1**	**0.048**	0.55 U	**0.041**
Acrylonitrile		107-13-1	*NE*	NE	NE		0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
Bromobenzene		108-86-1	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
Bromochloromethane		74-97-5	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
Bromodichloromethane		75-27-4	*NE*	NE	NE		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Bromoform		75-25-2	*NE*	NE	NE		0.0036 U	0.0034 U	0.0017 U	0.0046 U	0.0019 U	0.0019 U	0.0024 U	0.0027 U	0.0037 U	0.0039 U	0.0037 U	0.22 U	0.0033 U
Bromomethane		74-83-9	*NE*	NE	NE		0.0018 U	0.0017 U	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	0.0018 U	0.11 U	0.0016 U
n-Butylbenzene		104-51-8	*12*	12	100		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.027**	0.055 U	0.00083 U
sec-Butylbenzene		135-98-8	*11*	11	100		**0.00024 J**	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.012**	0.055 U	0.00083 U
tert-Butylbenzene		98-06-6	*5.9*	5.9	100		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	**0.0012 J**	0.27 U	0.0041 U
Carbon disulfide		75-15-0	*NE*	NE	NE		**0.0014 J**	0.0086 U	0.0043 U	**0.0025 J**	0.0047 U	**0.0037 J**	0.006 U	**0.0062 J**	**0.0039 J**	**0.0028 J**	**0.0016 J**	0.55 U	**0.0048 J**
Carbon tetrachloride		56-23-5	*0.76*	0.76	2.4		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Chlorobenzene		108-90-7	*1.1*	1.1	100		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Chloroethane		75-00-3	*NE*	NE	NE		0.0018 U	0.0017 U	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	0.0018 U	0.11 U	0.0016 U
Chloroform (Trichloromethane)		67-66-3	*0.37*	0.37	49		0.0013 U	0.0013 U	0.00065 U	0.0017 U	0.00071 U	0.00071 U	0.0009 U	0.001 U	0.0014 U	0.0015 U	0.0014 U	0.082 U	0.0012 U
Chloromethane		74-87-3	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
2-Chlorotoluene (o-Chlorotoluene)		95-49-8	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
4-Chlorotoluene (p-Chlorotoluene)		106-43-4	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
p-Cymene (4-Isopropyltoluene)		99-87-6	*NE*	NE	NE		**0.0041**	0.00086 U	**0.00013 J**	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.0016**	0.055 U	0.00083 U
1,2-Dibromo-3-chloropropane		96-12-8	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
Dibromochloromethane		124-48-1	*NE*	NE	NE		0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
1,2-Dibromoethane (EDB)		106-93-4	*NE*	NE	NE		0.0036 U	0.0034 U	0.0017 U	0.0046 U	0.0019 U	0.0019 U	0.0024 U	0.0027 U	0.0037 U	0.0039 U	0.0037 U	0.22 U	0.0033 U
Dibromomethane		74-95-3	*NE*	NE	NE		0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
1,2-Dichlorobenzene (o-DCB)		95-50-1	*1.1*	1.1	100		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,3-Dichlorobenzene (m-DCB)		541-73-1	*2.4*	2.4	49		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,4-Dichlorobenzene (p-DCB)		106-46-7	*1.8*	1.8	13		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
trans-1,4-dichloro-2-butene		110-57-6	*NE*	NE	NE		0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U

Table 3b. Remedial Investigation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

						Location Name	SB-101R	SB-103	SB-104	SB-105	SB-106	SB-107	SB-108	SB-109	SB-109R	SB-110	SB-111	SB-111	SB-112
						Sample Name	SB-101R (10-12)	SB-103 (10-12)	SB-104 (10-12)	SB-105 (10-12)	SB-106 (10-12)	SB-107 (10-12)	SB-108 (10-12)	SB-109 (8-10)	SB-109R (10-12)	SB-110 (10-12)	SB-111 (10-12)	SB-111 (14-15)	SB-112 (10-12)
						Start Depth	10	10	10	10	10	10	10	8	10	10	10	14	10
						End Depth	12	12	12	12	12	12	12	10	12	12	12	15	12
						Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
						Sample Date	5/11/2018	5/8/2018	5/8/2018	5/8/2018	5/11/2018	5/4/2018	5/7/2018	5/7/2018	5/9/2018	5/11/2018	5/7/2018	5/7/2018	5/11/2018
Analyte	Units	CAS No.	Unrestricted SCO	Protection of Groundwater SCO	Restricted-Residential SCO														
Dichlorodifluoromethane (Freon 12)		75-71-8	*NE*	NE	NE	0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
1,1-Dichloroethane		75-34-3	*0.27*	0.27	26	0.0013 U	0.0013 U	0.00065 U	0.0017 U	0.00071 U	0.00071 U	0.0009 U	0.001 U	0.0014 U	0.0015 U	0.0014 U	0.082 U	0.0012 U
1,2-Dichloroethane		107-06-2	*0.02*	0.02	3.1	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
1,1-Dichloroethene		75-35-4	*0.33*	0.33	100	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Total 1,2-Dichloroethene		540-59-0	*NE*	NE	NE	0.0009 U	**0.00071 J**	0.00043 U	0.0012 U	0.00047 U	**0.00019 J**	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
cis-1,2-Dichloroethene		156-59-2	*0.25*	0.25	100	0.0009 U	**0.00071 J**	0.00043 U	0.0012 U	0.00047 U	**0.00019 J**	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
trans-1,2-Dichloroethene		156-60-5	*0.19*	0.19	100	0.0013 U	0.0013 U	0.00065 U	0.0017 U	0.00071 U	0.00071 U	0.0009 U	0.001 U	0.0014 U	0.0015 U	0.0014 U	0.082 U	0.0012 U
1,2-Dichloropropane		78-87-5	*NE*	NE	NE	0.0031 U	0.003 U	0.0015 U	0.004 U	0.0016 U	0.0016 U	0.0021 U	0.0024 U	0.0032 U	0.0034 U	0.0032 U	0.19 U	0.0029 U
1,3-Dichloropropane		142-28-9	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
2,2-Dichloropropane		594-20-7	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,1-Dichloropropene		563-58-6	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
Total 1,3-Dichloropropene		542-75-6	*NE*	NE	NE	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
cis-1,3-Dichloropropene		10061-01-5	*NE*	NE	NE	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
trans-1,3-Dichloropropene		10061-02-6	*NE*	NE	NE	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Diethyl ether		60-29-7	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
p-Diethylbenzene		105-05-5	*NE*	NE	NE	0.0036 U	0.0034 U	0.0017 U	0.0046 U	0.0019 U	0.0019 U	0.0024 U	0.0027 U	0.0037 U	0.0039 U	**0.018**	0.22 U	0.0033 U
1,4-Dioxane		123-91-1	*0.1*	0.1	13	0.036 R	0.034 R	0.017 R	0.046 R	0.019 R	0.019 R	0.024 R	0.027 R	0.037 R	0.039 R	0.037 R	2.2 R	0.033 R
4-Ethyltoluene (p-Ethyltoluene)		622-96-8	*NE*	NE	NE	0.0036 U	0.0034 U	**0.0002 J**	0.0046 U	0.0019 U	0.0019 U	0.0024 U	0.0027 U	0.0037 U	0.0039 U	**0.0024 J**	0.22 U	0.0033 U
1,3-Hexachlorobutadiene (C-46)		87-68-3	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
2-Hexanone		591-78-6	*NE*	NE	NE	0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
Isopropylbenzene		98-82-8	*NE*	NE	NE	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.03**	0.055 U	0.00083 U
Methyl ethyl ketone (2-Butanone)		78-93-3	*0.12*	0.12	100	0.0095 U	**0.01**	**0.00093 J**	**0.0096 J**	0.0047 U	**0.0053**	0.006 U	0.0069 U	**0.0031 J**	0.018 U	0.0092 U	0.55 U	0.0083 U
Methyl tert-butyl ether (MTBE)		1634-04-4	*0.93*	0.93	100	**0.0014 J**	**0.00078 J**	**0.00016 J**	**0.001 J**	**0.00039 J**	**0.00016 J**	**0.00094 J**	0.0014 U	**0.0004 J**	0.002 U	0.0018 U	0.11 U	**0.00043 J**
4-Methyl-2-pentanone (MIBK)		108-10-1	*NE*	NE	NE	0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
Methylene chloride		75-09-2	*0.05*	0.05	100	0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
Naphthalene		91-20-3	*12*	12	100	**0.00033 J**	0.0043 U	**0.00041 J**	**0.00019 J**	0.0024 U	**0.00043 J**	0.003 U	**0.00025 J**	**0.00014 J**	**0.00073 J**	0.0046 U	0.27 U	**0.00012 J**
n-Propylbenzene		103-65-1	*3.9*	3.9	100	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	**0.074**	0.055 U	0.00083 U
Styrene		100-42-5	*NE*	NE	NE	0.0018 U	0.0017 U	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	0.0018 U	0.11 U	0.0016 U
1,1,1,2-Tetrachloroethane		630-20-6	*NE*	NE	NE	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
1,1,2,2-Tetrachloroethane		79-34-5	*NE*	NE	NE	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Tetrachloroethene (PCE)		127-18-4	*1.3*	1.3	19	0.0009 U	**0.00039 J**	0.00043 U	**0.00042 J**	0.00047 U	0.00047 U	0.0006 U	0.00069 U	**0.00032 J**	0.00098 U	0.00092 U	0.055 U	0.00083 U
1,2,4,5-Tetramethylbenzene		95-93-2	*NE*	NE	NE	0.0036 U	0.0034 U	**0.0014 J**	0.0046 U	0.0019 U	0.0019 U	0.0024 U	0.0027 U	0.0037 U	0.0039 U	**0.059**	0.22 U	0.0033 U
1,2,3-Trichlorobenzene		87-61-6	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,2,4-Trichlorobenzene		120-82-1	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,1,1-Trichloroethane (TCA)		71-55-6	*0.68*	0.68	100	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
1,1,2-Trichloroethane		79-00-5	*NE*	NE	NE	0.0013 U	0.0013 U	0.00065 U	0.0017 U	0.00071 U	0.00071 U	0.0009 U	0.001 U	0.0014 U	0.0015 U	0.0014 U	0.082 U	0.0012 U
Trichloroethene (TCE)		79-01-6	*0.47*	0.47	21	0.0009 U	0.00086 U	0.00043 U	0.0012 U	0.00047 U	0.00047 U	0.0006 U	0.00069 U	0.00092 U	0.00098 U	0.00092 U	0.055 U	0.00083 U
Trichlorofluoromethane (Freon 11)		75-69-4	*NE*	NE	NE	0.0045 U	0.0043 U	0.0022 U	0.0058 U	0.0024 U	0.0024 U	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,2,3-Trichloropropane		96-18-4	*NE*	NE	NE	0.009 U	0.0086 U	0.0043 U	0.012 U	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 U	0.0098 U	0.0092 U	0.55 U	0.0083 U
1,2,4-Trimethylbenzene		95-63-6	*3.6*	3.6	52	0.0045 U	0.0043 U	**0.00029 J**	0.0058 U	0.0024 U	**0.00011 J**	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
1,3,5-Trimethylbenzene		108-67-8	*8.4*	8.4	52	0.0045 U	0.0043 U	**0.00021 J**	0.0058 U	0.0024 U	**0.00016 J**	0.003 U	0.0034 U	0.0046 U	0.0049 U	0.0046 U	0.27 U	0.0041 U
Vinyl acetate		108-05-4	*NE*	NE	NE	0.009 U	0.0086 UJ	0.0043 UJ	0.012 UJ	0.0047 U	0.0047 U	0.006 U	0.0069 U	0.0092 UJ	0.0098 U	0.0092 U	0.55 U	0.0083 U

Table 3b. Remedial Investigation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

						Location Name	SB-101R	SB-103	SB-104	SB-105	SB-106	SB-107	SB-108	SB-109	SB-109R	SB-110	SB-111	SB-111	SB-112
						Sample Name	SB-101R (10-12)	SB-103 (10-12)	SB-104 (10-12)	SB-105 (10-12)	SB-106 (10-12)	SB-107 (10-12)	SB-108 (10-12)	SB-109 (8-10)	SB-109R (10-12)	SB-110 (10-12)	SB-111 (10-12)	SB-111 (14-15)	SB-112 (10-12)
						Start Depth	10	10	10	10	10	10	10	8	10	10	10	14	10
						End Depth	12	12	12	12	12	12	12	10	12	12	12	15	12
						Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
						Sample Date	5/11/2018	5/8/2018	5/8/2018	5/8/2018	5/11/2018	5/4/2018	5/7/2018	5/7/2018	5/9/2018	5/11/2018	5/7/2018	5/7/2018	5/11/2018
Analyte	**Units**	**CAS No.**	**Unrestricted SCO**	**Protection of Groundwater SCO**	**Restricted-Residential SCO**														
Vinyl chloride		75-01-4	*0.02*	0.02	0.9	0.0018 U	**0.0018**	0.00086 U	0.0023 U	0.00094 U	0.00095 U	0.0012 U	0.0014 U	0.0018 U	0.002 U	0.0018 U	0.11 U	0.0016 U
PAH17	mg/kg																	
Acenaphthene		83-32-9	*20*	98	100	**0.052 J**	0.15 U	**0.16**	**1.8**	0.16 U	**0.062 J**	0.16 U	0.16 U	**0.25**	**0.049 J**	0.21 U	NA	0.23 U
Acenaphthylene		208-96-8	*100*	107	100	**0.048 J**	0.15 U	**0.099 J**	**0.77**	0.16 U	**0.19**	0.16 U	0.16 U	**0.055 J**	**0.4**	**0.066 J**	NA	**0.048 J**
Anthracene		120-12-7	*100*	1000	100	**0.053 J**	0.11 U	**0.09 J**	**4**	0.12 U	**0.23**	0.12 U	0.12 U	**0.36**	**0.3**	**0.067 J**	NA	0.17 U
Benzo(a)anthracene		56-55-3	*1*	1	1	**0.14 J**	**0.069 J**	**0.47**	**7.6**	0.12 U	**0.62**	0.12 U	0.12 U	**0.64**	**0.8**	**0.33**	NA	**0.11 J**
Benzo(b)fluoranthene		205-99-2	*1*	1.7	1	**0.21**	**0.11**	**0.56**	**9**	0.12 U	**0.86**	0.12 U	0.12 U	**0.71**	**1.4**	**0.41**	NA	**0.16 J**
Benzo(k)fluoranthene		207-08-9	*0.8*	1.7	3.9	**0.059 J**	0.11 U	**0.19**	**2.7**	0.12 U	**0.31**	0.12 U	0.12 U	**0.23**	**0.37**	**0.15 J**	NA	**0.052 J**
Benzo(g,h,i)perylene		191-24-2	*100*	1000	100	**0.12 J**	**0.08 J**	**0.22**	**4**	0.16 U	**0.37**	0.16 U	0.16 U	**0.29**	**0.69**	**0.2 J**	NA	**0.083 J**
Benzo(a)pyrene		50-32-8	*1*	22	1	**0.15 J**	**0.084 J**	**0.42**	**6.6**	0.16 U	**0.6**	0.16 U	0.16 U	**0.56**	**1**	**0.38**	NA	**0.14 J**
Chrysene		218-01-9	*1*	1	3.9	**0.17**	**0.087 J**	**0.43**	**6.7**	0.12 U	**0.7**	0.12 U	**0.02 J**	**0.55**	**0.72**	**0.34**	NA	**0.11 J**
Dibenz(a,h)anthracene		53-70-3	*0.33*	1000	0.33	**0.034 J**	0.11 U	**0.072 J**	**1.1**	0.12 U	**0.097 J**	0.12 U	0.12 U	**0.089 J**	**0.16 J**	**0.056 J**	NA	0.17 U
Fluoranthene		206-44-0	*100*	1000	100	**0.27**	**0.074 J**	**0.74**	**17**	0.12 U	**1.2**	0.12 U	**0.04 J**	**1.4**	**1.4**	**0.42**	NA	**0.22**
Fluorene		86-73-7	*30*	386	100	**0.031 J**	0.19 U	**0.13 J**	**2.3**	0.2 U	**0.12 J**	0.2 U	0.2 U	**0.21 J**	**0.14 J**	**0.047 J**	NA	0.28 U
Indeno(1,2,3-cd)pyrene		193-39-5	*0.5*	8.2	0.5	**0.11 J**	**0.064 J**	**0.26**	**4.8**	0.16 U	**0.41**	0.16 U	0.16 U	**0.35**	**0.8**	**0.21**	NA	**0.088 J**
2-Methylnaphthalene		91-57-6	*NE*	NE	NE	**0.043 J**	0.22 U	0.23 U	**0.41**	0.24 U	**0.098 J**	0.25 U	0.24 U	**0.051 J**	**0.074 J**	0.31 U	NA	0.34 U
Naphthalene		91-20-3	*12*	12	100	**0.1 J**	0.19 U	**0.056 J**	**0.98**	0.2 U	**0.2**	0.2 U	0.2 U	**0.088 J**	**0.27 J**	**0.07 J**	NA	**0.1 J**
Phenanthrene		85-01-8	*100*	1000	100	**0.13 J**	**0.073 J**	**0.24**	**15**	0.12 U	**0.66**	0.12 U	0.12 U	**1.1**	**0.58**	**0.14 J**	NA	**0.096 J**
Pyrene		129-00-0	*100*	1000	100	**0.27**	**0.12**	**0.7**	**14**	0.12 U	**1.1**	0.12 U	**0.037 J**	**1.2**	**1.2**	**0.39**	NA	**0.21**
PAH17 Other SVOCs	mg/kg																	
Acetophenone		98-86-2	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Benzoic acid		65-85-0	*NE*	NE	NE	0.86 U	0.61 U	0.63 U	0.68 U	0.66 U	0.63 U	0.66 U	0.64 U	0.94 U	0.93 U	0.84 U	NA	0.93 U
Benzyl alcohol		100-51-6	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Biphenyl (1,1-Biphenyl)		92-52-4	*NE*	NE	NE	0.6 U	0.43 U	0.44 U	**0.14 J**	0.46 U	0.44 U	0.47 U	0.45 U	0.66 U	0.66 U	0.59 U	NA	0.65 U
Bis(2-chloroethoxy)methane		111-91-1	*NE*	NE	NE	0.28 U	0.2 U	0.21 U	0.23 U	0.22 U	0.21 U	0.22 U	0.21 U	0.31 U	0.31 U	0.28 U	NA	0.31 U
Bis(2-chloroethyl)ether		111-44-4	*NE*	NE	NE	0.24 U	0.17 U	0.17 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.26 U	0.26 U	0.23 U	NA	0.26 U
2,2-oxybis(1-Chloropropane)		108-60-1	*NE*	NE	NE	0.32 U	0.22 U	0.23 U	0.25 U	0.24 U	0.23 U	0.25 U	0.24 U	0.35 U	0.35 U	0.31 U	NA	0.34 U
Bis(2-ethylhexyl)phthalate		117-81-7	*NE*	NE	NE	**0.16 J**	**0.28**	0.19 U	0.21 U	0.2 U	**0.072 J**	0.2 U	**0.079 J**	0.29 U	**0.11 J**	0.26 U	NA	0.28 U
4-Bromophenyl phenyl ether		101-55-3	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Butyl benzyl phthalate		85-68-7	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Carbazole		86-74-8	*NE*	NE	NE	0.26 U	0.19 U	**0.022 J**	**1.8**	0.2 U	**0.1 J**	0.2 U	0.2 U	**0.14 J**	**0.081 J**	0.26 U	NA	0.28 U
4-Chloro-3-methylphenol		59-50-7	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
4-Chloroaniline		106-47-8	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2-Chloronaphthalene		91-58-7	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2-Chlorophenol		95-57-8	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
4-Chlorophenyl phenyl ether		7005-72-3	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Dibenzofuran		132-64-9	*7*	210	59	0.26 U	0.19 U	0.19 U	**1.2**	0.2 U	**0.064 J**	0.2 U	0.2 U	**0.1 J**	**0.072 J**	**0.024 J**	NA	0.28 U
1,2-Dichlorobenzene (o-DCB)		95-50-1	*1.1*	1.1	100	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
1,3-Dichlorobenzene (m-DCB)		541-73-1	*2.4*	2.4	49	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
1,4-Dichlorobenzene (p-DCB)		106-46-7	*1.8*	1.8	13	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
3,3-Dichlorobenzidine		91-94-1	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2,4-Dichlorophenol		120-83-2	*NE*	NE	NE	0.24 U	0.17 U	0.17 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.26 U	0.26 U	0.23 U	NA	0.26 U
Diethyl phthalate		84-66-2	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Dimethyl phthalate		131-11-3	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2,4-Dimethylphenol		105-67-9	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Di-n-butyl phthalate		84-74-2	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U

Table 3b. Remedial Investigation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

						Location Name	SB-101R	SB-103	SB-104	SB-105	SB-106	SB-107	SB-108	SB-109	SB-109R	SB-110	SB-111	SB-111	SB-112
						Sample Name	SB-101R (10-12)	SB-103 (10-12)	SB-104 (10-12)	SB-105 (10-12)	SB-106 (10-12)	SB-107 (10-12)	SB-108 (10-12)	SB-109 (8-10)	SB-109R (10-12)	SB-110 (10-12)	SB-111 (10-12)	SB-111 (14-15)	SB-112 (10-12)
						Start Depth	10	10	10	10	10	10	10	8	10	10	10	14	10
						End Depth	12	12	12	12	12	12	12	10	12	12	12	15	12
						Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
						Sample Date	5/11/2018	5/8/2018	5/8/2018	5/8/2018	5/11/2018	5/4/2018	5/7/2018	5/7/2018	5/9/2018	5/11/2018	5/7/2018	5/7/2018	5/11/2018
Analyte	**Units**	**CAS No.**	**Unrestricted SCO**	**Protection of Groundwater SCO**	**Restricted-Residential SCO**														
4,6-Dinitro-2-methylphenol		534-52-1	*NE*	NE	NE	0.69 U	0.49 U	0.5 U	0.55 U	0.53 U	0.51 U	0.53 U	0.51 U	0.75 U	0.75 U	0.67 U	NA	0.74 U
2,4-Dinitrophenol		51-28-5	*NE*	NE	NE	1.3 U	0.9 U	0.93 U	1 U	0.97 U	0.93 U	0.99 U	0.95 U	1.4 U	1.4 U	1.2 U	NA	1.4 U
2,4-Dinitrotoluene		121-14-2	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2,6-Dinitrotoluene		606-20-2	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Di-n-octyl phthalate		117-84-0	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Hexachlorobenzene		118-74-1	*0.33*	3.2	1.2	0.16 U	0.11 U	0.12 U	0.13 U	0.12 U	0.12 U	0.12 U	0.12 U	0.17 U	0.17 U	0.16 U	NA	0.17 U
1,3-Hexachlorobutadiene (C-46)		87-68-3	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Hexachlorocyclopentadiene		77-47-4	*NE*	NE	NE	0.75 U	0.54 U	0.56 U	0.6 U	0.58 U	0.56 U	0.59 U	0.56 U	0.83 U	0.82 U	0.74 U	NA	0.82 U
Hexachloroethane		67-72-1	*NE*	NE	NE	0.21 U	0.15 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U	0.23 U	0.23 U	0.21 U	NA	0.23 U
Isophorone		78-59-1	*NE*	NE	NE	0.24 U	0.17 U	0.17 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.26 U	0.26 U	0.23 U	NA	0.26 U
2-Methylnaphthalene		91-57-6	*NE*	NE	NE	**0.043 J**	0.22 U	0.23 U	**0.41**	0.24 U	**0.098 J**	0.25 U	0.24 U	**0.051 J**	**0.074 J**	0.31 U	NA	0.34 U
2-Methylphenol (o-Cresol)		95-48-7	*0.33*	0.33	100	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
3,4-Methylphenol (m,p-Cresol)		108394/106445	*NE*	NE	NE	**0.084 J**	0.27 U	0.28 U	**0.12 J**	0.29 U	**0.11 J**	0.3 U	0.28 U	0.42 U	**0.14 J**	**0.14 J**	NA	**0.079 J**
2-Nitroaniline		88-74-4	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
3-Nitroaniline		99-09-2	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
4-Nitroaniline		100-01-6	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Nitrobenzene		98-95-3	*NE*	NE	NE	0.24 U	0.17 U	0.17 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.26 U	0.26 U	0.23 U	NA	0.26 U
2-Nitrophenol		88-75-5	*NE*	NE	NE	0.57 U	0.4 U	0.42 U	0.46 U	0.44 U	0.42 U	0.44 U	0.43 U	0.63 U	0.62 U	0.56 U	NA	0.62 U
4-Nitrophenol		100-02-7	*NE*	NE	NE	0.37 U	0.26 U	0.27 U	0.3 U	0.28 U	0.27 U	0.29 U	0.28 U	0.4 U	0.4 U	0.36 U	NA	0.4 U
N-Nitrosodiphenylamine (NDFA)		86-30-6	*NE*	NE	NE	0.21 U	0.15 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U	0.23 U	0.23 U	0.21 U	NA	0.23 U
N-Nitrosodi-n-propylamine (NDPA)		621-64-7	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
Pentachlorophenol		87-86-5	*0.8*	0.8	6.7	0.21 U	0.15 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U	0.23 U	0.23 U	0.21 U	NA	0.23 U
Phenol		108-95-2	*0.33*	0.33	100	0.26 U	0.19 U	0.19 U	**0.05 J**	0.2 U	**0.03 J**	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
1,2,4,5-Tetrachlorobenzene		95-94-3	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
1,2,4-Trichlorobenzene		120-82-1	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2,4,5-Trichlorophenol		95-95-4	*NE*	NE	NE	0.26 U	0.19 U	0.19 U	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U	0.29 U	0.29 U	0.26 U	NA	0.28 U
2,4,6-Trichlorophenol		88-06-2	*NE*	NE	NE	0.16 U	0.11 U	0.12 U	0.13 U	0.12 U	0.12 U	0.12 U	0.12 U	0.17 U	0.17 U	0.16 U	NA	0.17 U
PCB Aroclors	mg/kg																	
Aroclor 1016		12674-11-2	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	0.0384 U	0.0407 U	0.0398 U	0.0554 U	0.0592 U	0.0518 U	NA	0.0576 U
Aroclor 1221		11104-28-2	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	0.0384 U	0.0407 U	0.0398 U	0.0554 U	0.0592 U	0.0518 U	NA	0.0576 U
Aroclor 1232		11141-16-5	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	0.0384 U	0.0407 U	0.0398 U	0.0554 U	0.0592 U	0.0518 U	NA	0.0576 U
Aroclor 1242		53469-21-9	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	0.0384 U	0.0407 U	0.0398 U	0.0554 U	0.0592 U	0.0518 U	NA	0.0576 U
Aroclor 1248		12672-29-6	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	0.0384 U	0.0407 U	0.0398 U	0.0554 U	0.0592 U	0.0518 U	NA	0.0576 U
Aroclor 1254		11097-69-1	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	**0.0238 J**	0.0407 U	0.0398 U	**0.131**	**0.00752 J**	**0.0143 J**	NA	0.0576 U
Aroclor 1260		11096-82-5	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	**0.0101 J**	0.0387 U	**0.0292 J**	0.0407 U	0.0398 U	**0.0434 J**	0.0592 U	**0.0168 J**	NA	0.0576 U
Aroclor 1262		37324-23-5	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	0.0384 U	0.0407 U	0.0398 U	0.0554 U	0.0592 U	0.0518 U	NA	0.0576 U
Aroclor 1268		11100-14-4	*NE*	NE	NE	0.0534 U	0.0363 U	0.0377 U	0.0418 U	0.0387 U	**0.0419**	0.0407 U	0.0398 U	**0.0213 J**	0.0592 U	**0.0108 J**	NA	0.0576 U
Total PCBs (Lab calculated)		1336-36-3	*0.1*	3.2	1	0.0534 U	0.0363 U	0.0377 U	**0.0101 J**	0.0387 U	**0.0949 J**	0.0407 U	0.0398 U	***0.196 J***	**0.00752 J**	**0.0419 J**	NA	0.0576 U
Pesticides	mg/kg																	
Aldrin		309-00-2	*0.005*	0.19	0.097	0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
alpha-BHC (Hexachlorocyclohexane)		319-84-6	*0.02*	0.02	0.48	0.0215 U	0.00359 U	0.0148 U	0.00425 U	0.00081 U	0.0372 U	0.000824 U	0.000785 U	0.00112 U	0.0575 U	0.0196 U	NA	0.00113 U
beta-BHC (beta-Hexachlorocyclohexane)		319-85-7	*0.036*	0.09	0.36	0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
gamma-BHC (gamma-Hexachlorocyclohexane) (Lindane)		58-89-9	*0.1*	0.1	1.3	0.0215 U	0.00359 U	0.0148 U	0.00425 U	0.00081 U	0.0372 U	0.000824 U	0.000785 U	0.00112 U	0.0575 U	0.0196 U	NA	0.00113 U
delta-BHC (delta-Hexachlorocyclohexane)		319-86-8	*0.04*	0.25	100	0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U

Table 3b. Remedial Investigation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

						Location Name	SB-101R	SB-103	SB-104	SB-105	SB-106	SB-107	SB-108	SB-109	SB-109R	SB-110	SB-111	SB-111	SB-112
						Sample Name	SB-101R (10-12)	SB-103 (10-12)	SB-104 (10-12)	SB-105 (10-12)	SB-106 (10-12)	SB-107 (10-12)	SB-108 (10-12)	SB-109 (8-10)	SB-109R (10-12)	SB-110 (10-12)	SB-111 (10-12)	SB-111 (14-15)	SB-112 (10-12)
						Start Depth	10	10	10	10	10	10	10	8	10	10	10	14	10
						End Depth	12	12	12	12	12	12	12	10	12	12	12	15	12
						Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
						Sample Date	5/11/2018	5/8/2018	5/8/2018	5/8/2018	5/11/2018	5/4/2018	5/7/2018	5/7/2018	5/9/2018	5/11/2018	5/7/2018	5/7/2018	5/11/2018
Analyte	**Units**	**CAS No.**	**Unrestricted SCO**	**Protection of Groundwater SCO**	**Restricted-Residential SCO**														
Chlordane (Alpha & Gamma)		57-74-9	*NE*	NE	NE		0.42 U	0.07 U	0.289 U	0.0829 U	0.0158 U	0.726 U	0.0161 U	0.0153 U	0.0219 U	1.12 U	0.383 U	NA	0.022 U
alpha-chlordane		5103-71-9	*0.094*	2.9	4.2		0.0646 U	0.0108 U	0.0444 U	0.0128 U	0.00243 U	0.112 U	0.00247 U	0.00236 U	0.00338 U	0.172 U	0.0589 U	NA	0.00338 U
gamma-Chlordane		5103-74-2	*NE*	NE	NE		0.0646 U	0.0108 U	0.0444 U	0.0128 U	0.00243 U	0.112 U	0.00247 U	0.00236 U	0.00338 U	0.172 U	0.0589 U	NA	0.00338 U
2,4-D (2,4-Dichlorophenoxyacetic acid)		94-75-7	*NE*	NE	NE		0.266 U	0.187 U	0.193 U	0.214 U	0.201 U	0.196 U	0.208 U	0.194 U	0.292 U	0.295 U	0.259 U	NA	0.287 U
4,4'-DDT (p,p'-DDT)		50-29-3	*0.0033*	136	7.9		0.0969 U	0.0162 U	0.0666 U	0.0191 U	0.00364 U	0.168 U	0.00371 U	0.00353 U	0.00506 U	0.259 U	0.0884 U	NA	0.00507 U
4,4'-DDE (p,p'-DDE)		72-55-9	*0.0033*	17	8.9		0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
4,4'-DDD (p,p-DDD)		72-54-8	*0.0033*	14	13		0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
Dieldrin		60-57-1	*0.005*	0.1	0.2		0.0323 U	0.00539 U	0.0222 U	0.00638 U	0.00122 U	0.0559 U	0.00124 U	0.00118 U	0.00169 U	0.0862 U	0.0294 U	NA	0.00169 U
alpha-Endosulfan (I)		959-98-8	*2.4*	102	24		0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
beta-Endosulfan (II)		33213-65-9	*2.4*	102	24		0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
Endosulfan sulfate		1031-07-8	*2.4*	1000	24		0.0215 U	0.00359 U	0.0148 U	0.00425 U	0.00081 U	0.0372 U	0.000824 U	0.000785 U	0.00112 U	0.0575 U	0.0196 U	NA	0.00113 U
Endrin		72-20-8	*0.014*	0.06	11		0.0215 U	0.00359 U	0.0148 U	0.00425 U	0.00081 U	0.0372 U	0.000824 U	0.000785 U	0.00112 U	0.0575 U	0.0196 U	NA	0.00113 U
Endrin aldehyde		7421-93-4	*NE*	NE	NE		0.0646 U	0.0108 U	0.0444 U	0.0128 U	0.00243 U	0.112 U	0.00247 U	0.00236 U	0.00338 U	0.172 U	0.0589 U	NA	0.00338 U
Endrin ketone		53494-70-5	*NE*	NE	NE		0.0517 U	0.00862 U	0.0355 U	0.0102 U	0.00194 U	0.0894 U	0.00198 U	0.00188 U	0.0027 U	0.138 U	0.0471 U	NA	0.0027 U
Heptachlor		76-44-8	*0.042*	0.38	2.1		0.0258 U	0.00431 U	0.0178 U	0.0051 U	0.000972 U	0.0447 U	0.000989 U	0.000942 U	0.00135 U	0.069 U	0.0236 U	NA	0.00135 U
Heptachlor epoxide		1024-57-3	*NE*	NE	NE		0.0969 U	0.0162 U	0.0666 U	0.0191 U	0.00364 U	0.168 U	0.00371 U	0.00353 U	0.00506 U	0.259 U	0.0884 U	NA	0.00507 U
Methoxychlor		72-43-5	*NE*	NE	NE		0.0969 U	0.0162 U	0.0666 U	0.0191 U	0.00364 U	0.168 U	0.00371 U	0.00353 U	0.00506 U	0.259 U	0.0884 U	NA	0.00507 U
2,4,5-TP (Silvex)		93-72-1	*3.8*	3.8	100		0.266 U	0.187 U	0.193 U	0.214 U	0.201 U	0.196 U	0.208 U	0.194 U	0.292 U	0.295 U	0.259 U	NA	0.287 U
Toxaphene		8001-35-2	*NE*	NE	NE		0.969 U	0.162 U	0.666 U	0.191 U	0.0364 U	1.68 U	0.0371 U	0.0353 U	0.0506 U	2.59 U	0.884 U	NA	0.0507 U
Herbicides	mg/kg																		
2,4-D (2,4-Dichlorophenoxyacetic acid)		94-75-7	*NE*	NE	NE		0.266 U	0.187 U	0.193 U	0.214 U	0.201 U	0.196 U	0.208 U	0.194 U	0.292 U	0.295 U	0.259 U	NA	0.287 U
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)		93-76-5	*NE*	NE	NE		0.266 U	0.187 U	0.193 U	0.214 U	0.201 U	0.196 U	0.208 U	0.194 U	0.292 U	0.295 U	0.259 U	NA	0.287 U
2,4,5-TP (Silvex)		93-72-1	*3.8*	3.8	100		0.266 U	0.187 U	0.193 U	0.214 U	0.201 U	0.196 U	0.208 U	0.194 U	0.292 U	0.295 U	0.259 U	NA	0.287 U
Total Metals	mg/kg																		
Aluminum		7429-90-5	*NE*	NE	NE		**14500**	**11200**	**8630**	**10200**	**4540**	**9920**	**5040**	**12800**	**11000**	**13300**	**11100**	NA	**16600**
Antimony		7440-36-0	*NE*	NE	NE		6.14 U	4.48 U	4.58 U	5.04 U	4.69 U	**0.518 J**	4.9 U	4.57 U	6.69 U	6.8 U	6.24 U	NA	6.67 U
Arsenic		7440-38-2	*13*	16	16		**22.9**	**3.74**	**2.53**	**6.91**	**1.79**	**4.77**	**1.55**	**0.722 J**	**16.2**	**8.94**	***15.7***	NA	**19.2**
Barium		7440-39-3	*350*	820	400		**112**	**85.9**	**80**	**48.7**	**20.6**	**94.1**	**21.5**	**139**	**61.7**	**108**	**96.7**	NA	**53.1**
Beryllium		7440-41-7	*7.2*	47	72		**0.7**	**0.287 J**	**0.174 J**	**0.504**	**0.244 J**	**0.213 J**	**0.157 J**	**0.119 J**	**0.468 J**	**0.326 J**	**0.212 J**	NA	**0.787**
Cadmium		7440-43-9	*2.5*	7.5	4.3		**1.09 J**	**0.35 J**	**0.266 J**	**1.46**	**0.328 J**	0.925 U	0.98 U	0.914 U	**0.79 J**	**1.35 J**	1.25 U	NA	**1 J**
Calcium		7440-70-2	*NE*	NE	NE		**4960**	**5180**	**19600**	**1660**	**1380**	**5470**	**763**	**1070**	**8390**	**6280**	**7320**	NA	**2490**
Chromium		7440-47-3	*30*	NE	180		***41.9***	**24.8**	**21.3**	**22**	**9.1**	**23.5**	**7.71**	**29.7**	***30.6***	***62.4***	***50.8***	NA	***38***
Hexavalent Chromium (Cr VI)		18540-29-9	*1*	19	110		1.3 UJ	0.905 U	0.933 U	1.04 U	**0.575 J-**	0.948 U	1 U	0.957 U	1.4 R	1.43 UJ	1.25 U	NA	1.39 UJ
Cobalt		7440-48-4	*NE*	NE	NE		**11.3**	**9.62**	**7.67**	**7.05**	**3.87**	**8.64**	**3.71**	**13.8**	**11.3**	**12.1**	**10.7**	NA	**11.1**
Copper		7440-50-8	*50*	1720	270		***79.7***	**31.2**	**26.9**	***55.4***	**11.6**	**45.2**	**10.6**	**42.9**	***99***	***75.4***	***109***	NA	***64.4***
Iron		7439-89-6	*NE*	NE	NE		**30600**	**18000**	**14600**	**26100**	**11000**	**17300**	**10400**	**21000**	**24100**	**25400**	**47600**	NA	**31700**
Lead		7439-92-1	*63*	450	400		***198***	**31.2**	**34.1**	***109***	**16.5**	***92.2***	**24.1**	**42.2**	***118***	***101***	***153***	NA	***128***
Magnesium		7439-95-4	*NE*	NE	NE		**7110**	**6760**	**13500**	**4320**	**1910**	**5750**	**1590**	**5370**	**6010**	**10000**	**5690**	NA	**7390**
Manganese		7439-96-5	*1600*	2000	2000		**349**	**279**	**235**	**354**	**255**	**213**	**106**	**146**	**262**	**289**	**400**	NA	**364**
Mercury		7439-97-6	*0.18*	0.73	0.81		**2.08**	**0.137**	**0.086**	**0.161**	0.08 U	***0.228***	0.079 U	0.075 U	**1.52**	***0.571***	**2.72**	NA	**1.91**
Nickel		7440-02-0	*30*	130	310		**27.8**	**16.7**	**15**	**24.1**	**7.89**	**18.1**	**7.35**	**23.8**	**26.4**	***39.8***	***31.5***	NA	**26.4**
Potassium		7440-09-7	*NE*	NE	NE		**2460**	**3140**	**2420**	**1790**	**724**	**3480**	**540**	**8430**	**3250**	**5230**	**1950**	NA	**3020**
Selenium		7782-49-2	*3.9*	4	180		**1.29 J**	**0.359 J**	1.83 U	**0.494 J**	**0.422 J**	**0.749 J**	**0.274 J**	**0.476 J**	**1.18 J**	**1.32 J**	**1.61 J**	NA	**1.41 J**
Silver		7440-22-4	*2*	8.3	180		**0.577 J**	0.897 U	0.917 U	**0.575 J**	0.938 U	**0.731 J**	0.98 U	0.914 U	**0.964 J**	**0.844 J**	**0.936 J**	NA	**0.841 J**
Sodium		7440-23-5	*NE*	NE	NE		**713**	**229**	**131 J**	**1630**	**108 J**	**935**	**249**	**609**	**3430**	**1740**	**1220**	NA	**2720**
Thallium		7440-28-0	*NE*	NE	NE		2.46 U	1.79 U	1.83 U	2.02 U	1.88 U	1.85 U	1.96 U	1.83 U	2.68 U	2.72 U	2.5 U	NA	2.67 U
Vanadium		7440-62-2	*NE*	NE	NE		**32**	**38.6**	**31.7**	**25.5**	**12.8**	**25.7**	**10.4**	**33.4**	**28.1**	**55**	**29.2**	NA	**33.5**
Zinc		7440-66-6	*109*	2480	10000		***264***	**55.8**	**49.8**	***1090***	**52**	***176***	***131***	**85.8**	***196***	***211***	***202***	NA	***172***
Cyanides	mg/kg																		
Total Cyanide		57-12-5	*27*	40	27		**0.71 J-**	1.1 UJ	1.1 UJ	**0.7 J-**	1.1 UJ	1.2 UJ	1.2 U	1.1 UJ	1.7 UJ	1.6 UJ	1.5 U	NA	1.7 UJ
Other																			
Percent Solids	%	SOLIDS	*NE*	NE	NE		**61.3**	**88.4**	**85.7**	**77**	**81.7**	**84.4**	**79.8**	**83.6**	**57**	**56.1**	**64.1**	**79.8**	**57.5**

Table 3b. Remedial Investigation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

Notes:

mg/kg = milligrams/kilogram or parts per million (ppm)
% = Percent

BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
PAH = Polycyclic Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
SVOC = Semi-Volatile Organic Compound
VOC = Volatile Organic Compound

6 NYCRR = New York State Register and Official Compilation of Codes, Rules and Regulations of the State of New York
Comparison of detected results are performed against one or more of the following NYCRR, Chapter IV, Part 375-6 Soil Cleanup Objectives (SCO)s: Unrestricted Use, Residential, Restricted-Residential, Commercial, Industrial, Protection of Ecological Resources, or Protection of Groundwater

CAS No. = Chemical Abstracts Service Number
NE = Not Established
NA = Not Analyzed
NYSDEC = New York State Department of Environmental Conservation

Bolding indicates a detected result concentration
Shading and bolding indicates that the detected concentration is above the NYSDOH guidance it was compared to
Gray shading and bolding indicates that the detected result value exceeds the Unrestricted SCO
Yellow shading and bolding indicates that the detected result value exceeds the Protection of Groundwater SCO
Orange shading and bolding indicates that the detected result value exceeds the Restricted-Residential SCO

Data Qualifiers:

+/- = result may be biased high/low, respectively
J = The result is an estimated value.
R = The result is rejected.
U = The result was not detected above the reporting limit.
UJ = The results was not detected at or above the reporting limit shown and the reporting limit is estimated.

Table 3c. UST Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

LOCATION						**SV103-UST-E**		**SV103-UST-W**	
SAMPLING DATE						**8/2/2019**		**8/2/2019**	
LAB SAMPLE ID						**L1934685-01**		**L1934685-02**	
SAMPLE TYPE						**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)						**5-7**		**5-7**	
		Units	**CasNum**	**Unrestricted SCO**	**Protection of Groundwater SCO**	**Restricted-Residential SCO**	**Results**	**Qual**	**Results**	**Qual**
Chlorinated Herbicides by GC		mg/kg								
	2,4-D		94-75-7				0.201	U	0.208	U
	2,4,5-T		93-76-5				0.201	U	0.208	U
	2,4,5-TP (Silvex)		93-72-1	3.8	100	3.8	0.201	U	0.208	U
General Chemistry										
	Solids, Total	%	NONE				81.2		79.3	
	Cyanide, Total	mg/kg	57-12-5	40	27	27	1.2	U	1.2	U
	Chromium, Hexavalent	mg/kg	18540-29-9	19	110	1	0.985	U	1.01	U
Organochlorine Pesticides by GC		mg/kg								
	Delta-BHC		319-86-8	0.25	100	0.04	0.0019	U	0.00194	U
	Lindane		58-89-9	0.1	1.3	0.1	0.000794	U	0.000808	U
	Alpha-BHC		319-84-6	0.02	0.48	0.02	0.000794	U	0.000808	U
	Beta-BHC		319-85-7	0.09	0.36	0.036	0.0019	U	0.00194	U
	Heptachlor		76-44-8	0.38	2.1	0.042	0.000953	U	0.00097	U
	Aldrin		309-00-2	0.19	0.097	0.005	0.0019	U	0.00194	U
	Heptachlor epoxide		1024-57-3				0.00357	U	0.00364	U
	Endrin		72-20-8	0.06	11	0.014	0.000794	U	0.000808	U
	Endrin aldehyde		7421-93-4				0.00238	U	0.00242	U
	Endrin ketone		53494-70-5				0.0019	U	0.00194	U
	Dieldrin		60-57-1	0.1	0.2	0.005	0.00119	U	0.00121	U
	4,4'-DDE		72-55-9	17	8.9	0.0033	0.0019	U	0.00194	U
	4,4'-DDD		72-54-8	14	13	0.0033	0.0019	U	0.00194	U
	4,4'-DDT		50-29-3	136	7.9	0.0033	0.00357	U	0.00364	U
	Endosulfan I		959-98-8	102	24	2.4	0.0019	U	0.00194	U
	Endosulfan II		33213-65-9	102	24	2.4	0.0019	U	0.00194	U
	Endosulfan sulfate		1031-07-8	1000	24	2.4	0.000794	U	0.000808	U
	Methoxychlor		72-43-5				0.00357	U	0.00364	U
	Toxaphene		8001-35-2				0.0357	U	0.0364	U
	cis-Chlordane		5103-71-9	2.9	4.2	0.094	0.00238	U	0.00242	U
	trans-Chlordane		5103-74-2				0.00238	U	0.00242	U
	Chlordane		57-74-9				0.0155	U	0.0158	U
Polychlorinated Biphenyls by GC		mg/kg								
	Aroclor 1016		12674-11-2	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1221		11104-28-2	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1232		11141-16-5	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1242		53469-21-9	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1248		12672-29-6	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1254		11097-69-1	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1260		11096-82-5	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1262		37324-23-5	3.2	1	0.1	0.0391	U	0.0418	U
	Aroclor 1268		11100-14-4	3.2	1	0.1	0.0391	U	0.0418	U
	PCBs, Total		1336-36-3	3.2	1	0.1	0.0391	U	0.0418	U
Semivolatile Organics by GC/MS		mg/kg								
	Acenaphthene		83-32-9	98	100	20	0.16	U	0.16	U
	1,2,4-Trichlorobenzene		120-82-1				0.2	U	0.21	U
	Hexachlorobenzene		118-74-1	3.2	1.2	0.33	0.12	U	0.12	U
	Bis(2-chloroethyl)ether		111-44-4				0.18	U	0.19	U
	2-Chloronaphthalene		91-58-7				0.2	U	0.21	U
	1,2-Dichlorobenzene		95-50-1	1.1	100	1.1	0.2	U	0.21	U
	1,3-Dichlorobenzene		541-73-1	2.4	49	2.4	0.2	U	0.21	U
	1,4-Dichlorobenzene		106-46-7	1.8	13	1.8	0.2	U	0.21	U
	3,3'-Dichlorobenzidine		91-94-1				0.2	U	0.21	U
	2,4-Dinitrotoluene		121-14-2				0.2	U	0.21	U
	2,6-Dinitrotoluene		606-20-2				0.2	U	0.21	U
	Fluoranthene		206-44-0	1000	100	100	**0.1**	J	**0.6**	
	4-Chlorophenyl phenyl ether		7005-72-3				0.2	U	0.21	U
	4-Bromophenyl phenyl ether		101-55-3				0.2	U	0.21	U
	Bis(2-chloroisopropyl)ether		108-60-1				0.24	U	0.25	U
	Bis(2-chloroethoxy)methane		111-91-1				0.22	U	0.22	U
	Hexachlorobutadiene		87-68-3				0.2	U	0.21	U
	Hexachlorocyclopentadiene		77-47-4				0.58	U	0.59	U
	Hexachloroethane		67-72-1				0.16	U	0.16	U
	Isophorone		78-59-1				0.18	U	0.19	U
	Naphthalene		91-20-3	12	100	12	0.2	U	0.21	U
	Nitrobenzene		98-95-3				0.18	U	0.19	U
	NDPA/DPA		86-30-6				0.16	U	0.16	U
	n-Nitrosodi-n-propylamine		621-64-7				0.2	U	0.21	U
	Bis(2-ethylhexyl)phthalate		117-81-7				0.2	U	0.21	U

Table 3c. UST Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

LOCATION						**SV103-UST-E**		**SV103-UST-W**	
SAMPLING DATE						**8/2/2019**		**8/2/2019**	
LAB SAMPLE ID						**L1934685-01**		**L1934685-02**	
SAMPLE TYPE						**SOIL**		**SOIL**	
SAMPLE DEPTH (ft.)						**5-7**		**5-7**	
		Units	**CasNum**	**Unrestricted SCO**	**Protection of Groundwater SCO**	**Restricted-Residential SCO**	**Results**	**Qual**	**Results**	**Qual**
	Butyl benzyl phthalate		85-68-7				0.2	U	0.21	U
	Di-n-butylphthalate		84-74-2				0.2	U	0.21	U
	Di-n-octylphthalate		117-84-0				0.2	U	0.21	U
	Diethyl phthalate		84-66-2				0.2	U	0.21	U
	Dimethyl phthalate		131-11-3				0.2	U	0.21	U
	Benzo(a)anthracene		56-55-3	1	1	1	**0.068**	J	**0.36**	
	Benzo(a)pyrene		50-32-8	22	1	1	**0.069**	J	**0.33**	
	Benzo(b)fluoranthene		205-99-2	1.7	1	1	**0.089**	J	**0.38**	
	Benzo(k)fluoranthene		207-08-9	1.7	3.9	0.8	**0.12**	U	**0.15**	
	Chrysene		218-01-9	1	3.9	1	**0.063**	J	**0.32**	
	Acenaphthylene		208-96-8	107	100	100	0.16	U	**0.058**	J
	Anthracene		120-12-7	1000	100	100	0.12	U	**0.06**	J
	Benzo(ghi)perylene		191-24-2	1000	100	100	**0.052**	J	**0.27**	
	Fluorene		86-73-7	386	100	30	0.2	U	0.21	U
	Phenanthrene		85-01-8	1000	100	100	**0.047**	J	**0.22**	
	Dibenzo(a,h)anthracene		53-70-3	1000	0.33	0.33	0.12	U	**0.047**	J
	Indeno(1,2,3-cd)pyrene		193-39-5	8.2	0.5	0.5	**0.057**	**J**	**0.25**	
	Pyrene		129-00-0	1000	100	100	**0.091**	**J**	**0.66**	
	Biphenyl		92-52-4				0.46	U	0.47	U
	4-Chloroaniline		106-47-8				0.2	U	0.21	U
	2-Nitroaniline		88-74-4				0.2	U	0.21	U
	3-Nitroaniline		99-09-2				0.2	U	0.21	U
	4-Nitroaniline		100-01-6				0.2	U	0.21	U
	Dibenzofuran		132-64-9	210	59	7	0.2	U	0.21	U
	2-Methylnaphthalene		91-57-6				0.24	U	0.25	U
	1,2,4,5-Tetrachlorobenzene		95-94-3				0.2	U	0.21	U
	Acetophenone		98-86-2				0.2	U	0.21	U
	2,4,6-Trichlorophenol		88-06-2				0.12	U	0.12	U
	p-Chloro-m-cresol		59-50-7				0.2	U	0.21	U
	2-Chlorophenol		95-57-8				0.2	U	0.21	U
	2,4-Dichlorophenol		120-83-2				0.18	U	0.19	U
	2,4-Dimethylphenol		105-67-9				0.2	U	0.21	U
	2-Nitrophenol		88-75-5				0.44	U	0.45	U
	4-Nitrophenol		100-02-7				0.28	U	0.29	U
	2,4-Dinitrophenol		51-28-5				0.97	U	0.99	U
	4,6-Dinitro-o-cresol		534-52-1				0.53	U	0.54	U
	Pentachlorophenol		87-86-5	0.8	6.7	0.8	0.16	U	0.16	U
	Phenol		108-95-2	0.33	100	0.33	0.2	U	0.21	U
	2-Methylphenol		95-48-7	0.33	100	0.33	0.2	U	0.21	U
	3-Methylphenol/4-Methylphenol		108-39-4/106-44-5	0.33	100	0.33	0.29	U	0.3	U
	2,4,5-Trichlorophenol		95-95-4				0.2	U	0.21	U
	Benzoic Acid		65-85-0				0.66	U	0.67	U
	Benzyl Alcohol		100-51-6				0.2	U	0.21	U
	Carbazole		86-74-8				0.2	U	0.025	J
	1,4-Dioxane		123-91-1	0.1	13	0.1	0.03	U	0.031	U
Total Metals		mg/kg								
	Aluminum, Total		7429-90-5				**10700**		**11500**	
	Antimony, Total		7440-36-0				**0.929**	J	**0.595**	J
	Arsenic, Total		7440-38-2	16	16	13	**2.96**		**3.94**	
	Barium, Total		7440-39-3	820	400	350	**75.8**		**58.3**	
	Beryllium, Total		7440-41-7	47	72	7.2	**0.348**	J	**0.417**	J
	Cadmium, Total		7440-43-9	7.5	4.3	2.5	0.967	U	0.992	U
	Calcium, Total		7440-70-2				**2710**		**1770**	
	Chromium, Total		7440-47-3				**16**		**15.1**	
	Cobalt, Total		7440-48-4				**7.09**		**6.68**	
	Copper, Total		7440-50-8	1720	270	50	**17.5**		**15.8**	
	Iron, Total		7439-89-6				**16000**		**16100**	
	Lead, Total		7439-92-1	450	400	63	**22.8**		**28.1**	
	Magnesium, Total		7439-95-4				**3490**		**3190**	
	Manganese, Total		7439-96-5	2000	2000	1600	**522**		**464**	
	Mercury, Total		7439-97-6	0.73	0.81	0.18	0.077	U	0.1	
	Nickel, Total		7440-02-0	130	310	30	**12.4**		**11.9**	
	Potassium, Total		7440-09-7				**1240**		**801**	
	Selenium, Total		7782-49-2	4	180	3.9	1.93	U	1.98	U
	Silver, Total		7440-22-4	8.3	180	2	0.967	U	0.992	U
	Sodium, Total		7440-23-5				**200**		**168**	J
	Thallium, Total		7440-28-0				1.93	U	1.98	U
	Vanadium, Total		7440-62-2				**25.9**		**20.1**	
	Zinc, Total		7440-66-6	2480	10000	109	**47.8**		**42.4**	
Volatile Organics by EPA 5035		mg/kg								
	Methylene chloride		75-09-2	0.05	100	0.05	0.005	U	0.0038	U
	1,1-Dichloroethane		75-34-3	0.27	26	0.27	0.001	U	0.00077	U
	Chloroform		67-66-3	0.37	49	0.37	0.0015	U	0.0012	U

Table 3c. UST Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

	LOCATION					**SV103-UST-E**		**SV103-UST-W**	
	SAMPLING DATE					**8/2/2019**		**8/2/2019**	
	LAB SAMPLE ID					**L1934685-01**		**L1934685-02**	
	SAMPLE TYPE					**SOIL**		**SOIL**	
	SAMPLE DEPTH (ft.)					**5-7**		**5-7**	
		Units	**CasNum**	**Unrestricted SCO**	**Protection of Groundwater SCO**	**Restricted-Residential SCO**	**Results**	**Qual**	**Results**	**Qual**
	Carbon tetrachloride		56-23-5	0.76	2.4	0.76	0.001	U	0.00077	U
	1,2-Dichloropropane		78-87-5				0.001	U	0.00032	J
	Dibromochloromethane		124-48-1				0.001	U	0.00077	U
	1,1,2-Trichloroethane		79-00-5				0.001	U	0.00077	U
	Tetrachloroethene		127-18-4	1.3	19	1.3	**0.022**		**0.016**	
	Chlorobenzene		108-90-7	1.1	100	1.1	0.0005	U	0.00038	U
	Trichlorofluoromethane		75-69-4				0.004	U	0.0031	U
	1,2-Dichloroethane		107-06-2	0.02	3.1	0.02	0.001	U	0.0037	
	1,1,1-Trichloroethane		71-55-6	0.68	100	0.68	0.0005	U	0.00038	U
	Bromodichloromethane		75-27-4				0.0005	U	0.00038	U
	trans-1,3-Dichloropropene		10061-02-6				0.001	U	0.00077	U
	cis-1,3-Dichloropropene		10061-01-5				0.0005	U	0.00038	U
	1,3-Dichloropropene, Total		542-75-6				0.0005	U	0.00038	U
	1,1-Dichloropropene		563-58-6				0.0005	U	0.00038	U
	Bromoform		75-25-2				0.004	U	0.0031	U
	1,1,2,2-Tetrachloroethane		79-34-5				0.0005	U	0.00038	U
	Benzene		71-43-2	0.06	4.8	0.06	0.0005	U	**0.012**	
	Toluene		108-88-3	0.7	100	0.7	**0.00078**	J	**0.14**	
	Ethylbenzene		100-41-4	1	41	1	0.001	U	**0.0097**	
	Chloromethane		74-87-3				0.004	U	0.0031	U
	Bromomethane		74-83-9				0.002	U	0.0015	U
	Vinyl chloride		75-01-4	0.02	0.9	0.02	0.001	U	0.00077	U
	Chloroethane		75-00-3				0.002	U	0.0015	U
	1,1-Dichloroethene		75-35-4	0.33	100	0.33	0.001	U	0.00077	U
	trans-1,2-Dichloroethene		156-60-5	0.19	100	0.19	0.0015	U	0.0012	U
	Trichloroethene		79-01-6	0.47	21	0.47	**0.007**		**0.0028**	
	1,2-Dichlorobenzene		95-50-1	1.1	100	1.1	0.002	U	0.0015	U
	1,3-Dichlorobenzene		541-73-1	2.4	49	2.4	0.002	U	0.0015	U
	1,4-Dichlorobenzene		106-46-7	1.8	13	1.8	0.002	U	0.0015	U
	Methyl tert butyl ether		1634-04-4	0.93	100	0.93	**0.00025**	J	0.0015	U
	p/m-Xylene		179601-23-1				0.002	U	**0.037**	
	o-Xylene		95-47-6				0.001	U	**0.02**	
	Xylenes, Total		1330-20-7	1.6	100	0.26	0.001	U	0.057	
	cis-1,2-Dichloroethene		156-59-2	0.25	100	0.25	0.001	U	0.00077	U
	1,2-Dichloroethene, Total		540-59-0				0.001	U	0.00077	U
	Dibromomethane		74-95-3				0.002	U	0.0015	U
	Styrene		100-42-5				0.001	U	0.00077	U
	Dichlorodifluoromethane		75-71-8				0.01	U	0.0077	U
	Acetone		67-64-1	0.05	100	0.05	0.01	U	**0.0092**	
	Carbon disulfide		75-15-0				0.01	U	0.0077	U
	2-Butanone		78-93-3	0.12	100	0.12	0.01	U	0.0077	U
	Vinyl acetate		108-05-4				0.01	U	0.0077	U
	4-Methyl-2-pentanone		108-10-1				0.01	U	0.0077	U
	1,2,3-Trichloropropane		96-18-4				0.002	U	0.0015	U
	2-Hexanone		591-78-6				0.01	U	0.0077	U
	Bromochloromethane		74-97-5				0.002	U	0.0015	U
	2,2-Dichloropropane		594-20-7				0.002	U	0.0015	U
	1,2-Dibromoethane		106-93-4				0.001	U	0.00077	U
	1,3-Dichloropropane		142-28-9				0.002	U	0.0015	U
	1,1,1,2-Tetrachloroethane		630-20-6				0.0005	U	0.00038	U
	Bromobenzene		108-86-1				0.002	U	0.0015	U
	n-Butylbenzene		104-51-8	12	100	12	0.001	U	0.00077	U
	sec-Butylbenzene		135-98-8	11	100	11	0.001	U	0.00077	U
	tert-Butylbenzene		98-06-6	5.9	100	5.9	0.002	U	0.0015	U
	o-Chlorotoluene		95-49-8				0.002	U	0.0015	U
	p-Chlorotoluene		106-43-4				0.002	U	0.0015	U
	1,2-Dibromo-3-chloropropane		96-12-8				0.003	U	0.0023	U
	Hexachlorobutadiene		87-68-3				0.004	U	0.0031	U
	Isopropylbenzene		98-82-8				0.001	U	**0.00041**	J
	p-Isopropyltoluene		99-87-6				0.001	U	0.00077	U
	Naphthalene		91-20-3	12	100	12	0.004	U	0.0031	U
	Acrylonitrile		107-13-1				0.004	U	0.0031	U
	n-Propylbenzene		103-65-1	3.9	100	3.9	0.001	U	**0.0007**	J
	1,2,3-Trichlorobenzene		87-61-6				0.002	U	0.0015	U
	1,2,4-Trichlorobenzene		120-82-1				0.002	U	0.0015	U
	1,3,5-Trimethylbenzene		108-67-8	8.4	52	8.4	0.002	U	**0.0013**	J
	1,2,4-Trimethylbenzene		95-63-6	3.6	52	3.6	0.002	U	**0.0042**	
	1,4-Dioxane		123-91-1	0.1	13	0.1	0.08	U	0.062	U
	p-Diethylbenzene		105-05-5				0.002	U	**0.00079**	J
	p-Ethyltoluene		622-96-8				0.002	U	**0.0037**	
	1,2,4,5-Tetramethylbenzene		95-93-2				0.002	U	**0.00025**	J
	Ethyl ether		60-29-7				0.002	U	0.0015	U
	trans-1,4-Dichloro-2-butene		110-57-6				0.005	U	0.0038	U

Table 3c. UST Post-Excavation Soil Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

Notes:

mg/kg = milligrams/kilogram or parts per million (ppm)
% = Percent
µg/kg = micrograms per kilogram

PAH = Polycyclic Aromatic Hydrocarbon
SVOC = Semi-Volatile Organic Compound
VOC = Volatile Organic Compound

6 NYCRR = New York State Register and Official Compilation of Codes, Rules and Regulations of the State of New York

Comparison of detected results are performed against one or more of the following NYCRR, Chapter IV, Part 375-6 Soil Cleanup Objectives (SCO)s: Unrestricted Use, Residential, Restricted-Residential, Commercial, Industrial, Protection of Ecological Resources, or Protection of Groundwater

CAS No. = Chemical Abstracts Service Number
NE = Not Established
NA = Not Analyzed
NYSDEC = New York State Department of Environmental Conservation

Bolding indicates a detected result concentration
Shading and bolding indicates that the detected concentration is above the NYSDEC guidance it was compared to
Gray shading and bolding indicates that the detected result value exceeds the Unrestricted SCO
Yellow shading and bolding indicates that the detected result value exceeds the Protection of Groundwater SCO
Green shading and bolding indicates that the detected result value exceeds the Restricted-Residential SCO

Data Qualifiers:

J = The result is an estimated value.
U = The result was not detected above the reporting limit.

Table 4. Historical Groundwater Sample Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

			Sample Name	MW-103	MW-X	MW-104	MW-105	MW-109	MW-111	MW-111A	MW-111X
			Sample Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/23/2018	5/23/2018	11/9/2018	11/9/2018
			Parent Sample		MW-103						MW-111A
Analyte	**Units**	**CAS No.**	**NYS AWQS**								
BTEX	ug/L										
Benzene		71-43-2	1	**0.56**	**0.6**	0.5 U	0.5 U	0.5 U	**1.5**	NA	NA
Toluene		108-88-3	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Ethylbenzene		100-41-4	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
o-Xylene		95-47-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
m/p-Xylene		179601-23-1	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**1.5 J**	NA	NA
Total Xylene		1330-20-7	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**1.5 J**	NA	NA
Other VOCs	ug/L										
Acetone		67-64-1	50*	5 U	5 U	7.6 U	5 U	5 U	8.8 U	NA	NA
Acrylonitrile		107-13-1	5	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	NA	NA
Bromobenzene		108-86-1	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Bromochloromethane		74-97-5	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Bromodichloromethane		75-27-4	50*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Bromoform		75-25-2	50*	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
Bromomethane		74-83-9	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
n-Butylbenzene		104-51-8	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**3.5**	NA	NA
sec-Butylbenzene		135-98-8	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**2.1 J**	NA	NA
tert-Butylbenzene		98-06-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Carbon disulfide		75-15-0	60*	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
Carbon tetrachloride		56-23-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Chlorobenzene		108-90-7	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Chloroethane		75-00-3	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Chloroform (Trichloromethane)		67-66-3	7	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Chloromethane		74-87-3	5	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	NA	NA
2-Chlorotoluene (o-Chlorotoluene)		95-49-8	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
4-Chlorotoluene (p-Chlorotoluene)		106-43-4	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
p-Cymene (4-Isopropyltoluene)		99-87-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,2-Dibromo-3-chloropropane		96-12-8	0.04	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Dibromochloromethane		124-48-1	50*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
1,2-Dibromoethane (EDB)		106-93-4	0.0006	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
Dibromomethane		74-95-3	5	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
1,2-Dichlorobenzene (o-DCB)		95-50-1	3	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,3-Dichlorobenzene (m-DCB)		541-73-1	3	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,4-Dichlorobenzene (p-DCB)		106-46-7	3	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
trans-1,4-dichloro-2-butene		110-57-6	5	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	NA	NA
Dichlorodifluoromethane (Freon 12)		75-71-8	5	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
1,1-Dichloroethane		75-34-3	5	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	NA	NA
1,2-Dichloroethane		107-06-2	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
1,1-Dichloroethene		75-35-4	5	**0.32 J**	**0.29 J**	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Total 1,2-Dichloroethene		540-59-0		**67**	**69**	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA

Table 4. Historical Groundwater Sample Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

			Sample Name	MW-103	MW-X	MW-104	MW-105	MW-109	MW-111	MW-111A	MW-111X
			Sample Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/23/2018	5/23/2018	11/9/2018	11/9/2018
			Parent Sample		MW-103						MW-111A
Analyte	**Units**	**CAS No.**	**NYS AWQS**								
cis-1,2-Dichloroethene		156-59-2	5	**67**	**69**	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
trans-1,2-Dichloroethene		156-60-5	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,2-Dichloropropane		78-87-5	1	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
1,3-Dichloropropane		142-28-9	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
2,2-Dichloropropane		594-20-7	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,1-Dichloropropene		563-58-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Total 1,3-Dichloropropene		542-75-6	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
cis-1,3-Dichloropropene		10061-01-5	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
trans-1,3-Dichloropropene		10061-02-6	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Diethyl ether		60-29-7		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
p-Diethylbenzene		105-05-5		2 U	2 U	2 U	2 U	2 U	**3.2**	NA	NA
1,4-Dioxane		123-91-1		250 R	250 R	250 R	250 R	250 R	250 R	NA	NA
4-Ethyltoluene (p-Ethyltoluene)		622-96-8		2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
1,3-Hexachlorobutadiene (C-46)		87-68-3	0.5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
2-Hexanone		591-78-6	50*	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
Isopropylbenzene		98-82-8	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**9.5**	NA	NA
Methyl ethyl ketone (2-Butanone)		78-93-3	50*	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
Methyl tert-butyl ether (MTBE)		1634-04-4	10*	**1.1 J**	**1 J**	**3.4**	2.5 U	2.5 U	**2.3 J**	NA	NA
4-Methyl-2-pentanone (MIBK)		108-10-1		5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
Methylene chloride		75-09-2	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Naphthalene		91-20-3	10*	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**1.2 J**	NA	NA
n-Propylbenzene		103-65-1	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	**20**	NA	NA
Styrene		100-42-5	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,1,1,2-Tetrachloroethane		630-20-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,1,2,2-Tetrachloroethane		79-34-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Tetrachloroethene (PCE)		127-18-4	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
1,2,4,5-Tetramethylbenzene		95-93-2	5	2 U	2 U	2 U	2 U	2 U	**22**	NA	NA
1,2,3-Trichlorobenzene		87-61-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,2,4-Trichlorobenzene		120-82-1	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,1,1-Trichloroethane (TCA)		71-55-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,1,2-Trichloroethane		79-00-5	1	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	NA	NA
Trichloroethene (TCE)		79-01-6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Trichlorofluoromethane (Freon 11)		75-69-4	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,2,3-Trichloropropane		96-18-4	0.04	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,2,4-Trimethylbenzene		95-63-6	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
1,3,5-Trimethylbenzene		108-67-8	5	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA
Vinyl acetate		108-05-4		5 U	5 U	5 U	5 U	5 U	5 U	NA	NA
Vinyl chloride		75-01-4	2	**42 J-**	**44 J-**	1 UJ	1 UJ	1 UJ	1 UJ	NA	NA
NYSDEC PAH17	ug/L										
Acenaphthene		83-32-9	20*	0.1 U	0.1 U	**11**	0.1 U	0.1 U	**3.2**	**3.2**	**3.1**
Acenaphthylene		208-96-8		0.1 U	0.1 U	**0.2**	0.1 U	**0.07 J**	0.16 U	0.22	0.21
Anthracene		120-12-7	50*	0.1 U	0.1 U	**0.62**	0.1 U	**0.06 J**	**0.76**	**0.54**	**0.53**
Benzo(a)anthracene		56-55-3	0.002*	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.13**	**0.06 J**	**0.05 J**
Benzo(b)fluoranthene		205-99-2	0.002*	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.07 J**	**0.1 U**	**0.1 U**
Benzo(k)fluoranthene		207-08-9	0.002*	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table 4. Historical Groundwater Sample Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

			Sample Name	MW-103	MW-X	MW-104	MW-105	MW-109	MW-111	MW-111A	MW-111X
			Sample Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/23/2018	5/23/2018	11/9/2018	11/9/2018
			Parent Sample		MW-103						MW-111A
Analyte	**Units**	**CAS No.**	**NYS AWQS**								
Benzo(g,h,i)perylene		191-24-2		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene		50-32-8	ND	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.05 J**	**0.1 U**	**0.1 U**
Chrysene		218-01-9	0.002*	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.11**	**0.06 J**	**0.05 J**
Dibenz(a,h)anthracene		53-70-3		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene		206-44-0	50*	0.1 U	0.1 U	**0.81**	0.1 U	0.1 U	**1.3**	**0.96**	**0.91**
Fluorene		86-73-7	50*	0.1 U	0.1 U	**4.4**	0.1 U	0.1 U	**3**	**3.7**	**3.7**
Indeno(1,2,3-cd)pyrene		193-39-5	0.002*	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene		91-57-6		0.1 U	0.1 U	**0.16**	0.1 U	0.1 U	**0.34**	**0.1**	**0.09 J**
Naphthalene		91-20-3	10*	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U	**0.91**	**0.22**	**0.24**
Phenanthrene		85-01-8	50*	0.1 U	0.1 U	**0.86**	0.1 U	0.1 U	**1.9**	**1.2**	**1.2**
Pyrene		129-00-0	50*	0.1 U	0.1 U	**0.5**	0.1 U	0.1 U	**0.9**	**0.65**	**0.61**
NYSDEC PAH17 Other SVOCs	ug/L										
Acetophenone		98-86-2		4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Benzoic acid		65-85-0		48 R	49 R	48 R	50 R	50 R	50 R	50 U	50 U
Benzyl alcohol		100-51-6		1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
Biphenyl (1,1-Biphenyl)		92-52-4	5	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
Bis(2-chloroethoxy)methane		111-91-1	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Bis(2-chloroethyl)ether		111-44-4	1	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
2,2-oxybis(1-Chloropropane)		108-60-1	5	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
Bis(2-ethylhexyl)phthalate		117-81-7	5	**0.92 J**	**2.2 J**	**1 J**	**1 J**	3 U	3 U	3 U	2.4 J
4-Bromophenyl phenyl ether		101-55-3		1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
Butyl benzyl phthalate		85-68-7	50*	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Carbazole		86-74-8		1.9 U	2 U	**0.88 J**	2 U	2 U	2 U	2 U	2 U
4-Chloro-3-methylphenol		59-50-7		1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
4-Chloroaniline		106-47-8	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 UJ	5 UJ
2-Chloronaphthalene		91-58-7	10*	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chlorophenol		95-57-8		1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
4-Chlorophenyl phenyl ether		7005-72-3		1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
Dibenzofuran		132-64-9		1.9 U	2 U	1.9 U	2 U	2 U	**2**	**1.5 J**	**1.5 J**
1,2-Dichlorobenzene (o-DCB)		95-50-1	3	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
1,3-Dichlorobenzene (m-DCB)		541-73-1	3	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
1,4-Dichlorobenzene (p-DCB)		106-46-7	3	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
3,3-Dichlorobenzidine		91-94-1	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 R	5 U
2,4-Dichlorophenol		120-83-2	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Diethyl phthalate		84-66-2	50*	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Dimethyl phthalate		131-11-3	50*	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2,4-Dimethylphenol		105-67-9	50*	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Di-n-butyl phthalate		84-74-2	50	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
4,6-Dinitro-2-methylphenol		534-52-1		9.7 U	9.9 U	9.7 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol		51-28-5	10*	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2,4-Dinitrotoluene		121-14-2	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene		606-20-2	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Di-n-octyl phthalate		117-84-0	50*	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
1,4-Dioxane		123-91-1	0.35	0.147	0.15	0.142	0.147	0.147 U	**2.37**	NA	NA

Table 4. Historical Groundwater Sample Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

			Sample Name	MW-103	MW-X	MW-104	MW-105	MW-109	MW-111	MW-111A	MW-111X
			Sample Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/23/2018	5/23/2018	11/9/2018	11/9/2018
			Parent Sample		MW-103						MW-111A
Analyte	**Units**	**CAS No.**	**NYS AWQS**								
Hexachlorobenzene		118-74-1	0.04	0.78 U	0.79 U	0.78 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,3-Hexachlorobutadiene (C-46)		87-68-3	0.5	0.48 U	0.49 U	0.48 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorocyclopentadiene		77-47-4	5	19 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Hexachloroethane		67-72-1	5	0.78 U	0.79 U	0.78 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Isophorone		78-59-1	50*	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2-Methylphenol (o-Cresol)		95-48-7	1	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
3,4-Methylphenol (m,p-Cresol)		108394/106445		4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2-Nitroaniline		88-74-4	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
3-Nitroaniline		99-09-2	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
4-Nitroaniline		100-01-6	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 UJ	5 U
Nitrobenzene		98-95-3	0.4	1.9 U	2 U	1.9 U	2 U	2 U	2 U	10 U	10 U
2-Nitrophenol		88-75-5		9.7 U	9.9 U	9.7 U	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol		100-02-7		9.7 U	9.9 U	9.7 U	10 U	10 U	10 U	2 U	2 U
N-Nitrosodiphenylamine (NDFA)		86-30-6	50*	1.9 U	2 U	1.9 U	2 U	2 U	2 U	2 U	2 U
N-Nitrosodi-n-propylamine (NDPA)		621-64-7		4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol		87-86-5	1	0.78 U	0.79 U	0.78 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Phenol		108-95-2	1	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
1,2,4,5-Tetrachlorobenzene		95-94-3	5	9.7 U	9.9 U	9.7 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene		120-82-1	5	4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol		95-95-4		4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol		88-06-2		4.8 U	4.9 U	4.8 U	5 U	5 U	5 U	5 U	5 U
2.65 PFAS	ng/L										
N-ethyl perfluorooctanesulfonamidoacetic acid		2991-50-6	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
N-methyl perfluorooctanesulfonamidoacetic acid		2355-31-9	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
Perfluorobutanesulfonic acid (PFBS)		375-73-5	100**	**5.66**	**5.35**	**2.18**	**4.76**	**1.92**	**7.52**	NA	NA
Perfluorobutanoic Acid		375-22-4	100**	**8.41**	**8.36**	**0.77 J-**	**7.45**	**3.15**	**18.6**	NA	NA
Perfluorodecane Sulfonic Acid		335-77-3	100**	2.08 UJ	1.92 UJ	1.85 UJ	1.92 UJ	1.78 U	1.85 U	NA	NA
Perfluorodecanoic acid (PFDA)		335-76-2	100**	2.08 U	1.92 U	1.85 U	**0.923 J**	**0.428 J**	1.85 U	NA	NA
Perfluorododecanoic acid (PFDoA)		307-55-1	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
Perfluoroheptane Sulfonate (PFHPS)		375-92-8	100**	2.08 U	1.92 U	1.85 U	**1.18 J**	1.78 U	**3.94**	NA	NA
Perfluoroheptanoic acid (PFHpA)		375-85-9	100**	**5.93**	**5.53**	**0.733 J**	**9.23**	**2.17**	**12.6**	NA	NA
Perfluorohexanoic acid (PFHxA)		307-24-4	100**	**7.37**	**7.05**	**0.574 J**	**9.14**	**3.04**	**15.7**	NA	NA
Perfluorooctane Sulfonamide (FOSA)		754-91-6	100**	2.08 UJ	1.92 UJ	1.85 R	1.92 UJ	1.78 UJ	1.85 U	NA	NA
Perfluoropentanoic Acid (PFPeA)		2706-90-3	100**	**9.73**	**9.38**	1.85 U	**13.3**	**4.34**	**14.8**	NA	NA
Perfluorotetradecanoic acid (PFTA)		376-06-7	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
Perfluorotridecanoic acid (PFTrDA)		72629-94-8	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
Perfluoroundecanoic acid (PFUnA)		2058-94-8	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)		39108-34-4	100**	2.08 U	1.92 U	1.85 U	1.92 U	1.78 U	1.85 U	NA	NA
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)		27619-97-2	100**	**9.11**	**5.66**	1.85 U	**7.4**	1.78 U	1.85 U	NA	NA
Perfluorohexane sulfonate (PFHxS)		355-46-4	100**	**3.64**	**2.59**	1.85 U	**4.21**	**1.99**	**77.6**	NA	NA
Perfluorononanoic Acid (PFNA)		375-95-1	100**	2.08 U	1.92 U	1.85 U	**8.35**	1.78 U	**5.3**	NA	NA
Perfluorooctane sulfonate (PFOS)		1763-23-1		**7.96 J-**	**8.08 J-**	1.85 UJ	**45 J-**	**9.04**	**48.7**	NA	NA
Perfluorooctanoic Acid (PFOA)		335-67-1		**33.1**	**31.7**	**3.53**	**41.4**	**14.7**	**97**	NA	NA
Total PFOA + PFOS			70**	**41.06 J-**	**39.78 J-**	**3.53**	**86.4 J-**	**23.74**	**145.7**	NA	NA
Total PFAS			500**	**90.91 J-**	**83.7 J-**	**7.787 J-**	**152.343 J-**	**40.778 J**	**301.76**	NA	NA

Table 4. Historical Groundwater Sample Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

			Sample Name	MW-103	MW-X	MW-104	MW-105	MW-109	MW-111	MW-111A	MW-111X
			Sample Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/23/2018	5/23/2018	11/9/2018	11/9/2018
			Parent Sample		MW-103						MW-111A
Analyte	**Units**	**CAS No.**	**NYS AWQS**								
PCB Aroclors	ug/L										
Aroclor 1016		12674-11-2		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1221		11104-28-2		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1232		11141-16-5		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1242		53469-21-9		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1248		12672-29-6		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1254		11097-69-1		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1260		11096-82-5		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1262		37324-23-5		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Aroclor 1268		11100-14-4		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Total PCBs (Lab calculated)		1336-36-3	0.09	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	NA	NA
Pesticides	ug/L										
Aldrin		309-00-2	ND	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
alpha-BHC (Hexachlorocyclohexane)		319-84-6	0.01	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
beta-BHC (beta-Hexachlorocyclohexane)		319-85-7	0.04	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
gamma-BHC (gamma-Hexachlorocyclohexane) (Lindane)		58-89-9	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
delta-BHC (delta-Hexachlorocyclohexane)		319-86-8	0.04	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Chlordane (Alpha & Gamma)		57-74-9	0.05	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
alpha-chlordane		5103-71-9		0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
gamma-Chlordane		5103-74-2		0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
2,4-D (2,4-Dichlorophenoxyacetic acid)		94-75-7	50	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA
4,4'-DDT (p,p'-DDT)		50-29-3	0.2	0.04 U	0.04 U	**0.05 J**	0.04 U	0.04 U	0.04 U	NA	NA
4,4'-DDE (p,p'-DDE)		72-55-9	0.2	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
4,4-DDD (p,p-DDD)		72-54-8	0.3	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
Dieldrin		60-57-1	0.004	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
alpha-Endosulfan (I)		959-98-8		0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
beta-Endosulfan (II)		33213-65-9		0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
Endosulfan sulfate		1031-07-8		0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
Endrin		72-20-8	0	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
Endrin aldehyde		7421-93-4	5	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
Endrin ketone		53494-70-5	5	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	NA	NA
Heptachlor		76-44-8	0.04	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Heptachlor epoxide		1024-57-3	0.03	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
Methoxychlor		72-43-5	35	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
2,4,5-TP (Silvex)		93-72-1	0.26	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
Toxaphene		8001-35-2	0.06	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
Herbicides	ug/L										
2,4-D (2,4-Dichlorophenoxyacetic acid)		94-75-7	50	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)		93-76-5	35	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
2,4,5-TP (Silvex)		93-72-1	0.26	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
Dissolved Metals	mg/L										
Aluminum		7429-90-5		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	**0.0051 J-**	0.01 UJ	NA	NA
Antimony		7440-36-0	0.003	0.004 UJ	0.004 UJ	0.004 UJ	0.004 UJ	0.004 UJ	0.004 UJ	NA	NA
Arsenic		7440-38-2	0.025	**0.00073 J-**	**0.00077 J-**	**0.00051 J-**	**0.00018 J-**	**0.00062 J-**	**0.00024 J-**	NA	NA

Table 4. Historical Groundwater Sample Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

			Sample Name	MW-103	MW-X	MW-104	MW-105	MW-109	MW-111	MW-111A	MW-111X
			Sample Date	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/23/2018	5/23/2018	11/9/2018	11/9/2018
			Parent Sample		MW-103						MW-111A
Analyte	**Units**	**CAS No.**	**NYS AWQS**								
Barium		7440-39-3	1	**0.0063 J-**	**0.00675 J-**	**0.2962 J-**	**0.7494 J-**	**0.06565 J-**	**2.288 J-**	NA	NA
Beryllium		7440-41-7	0.003*	0.0005 UJ	0.0005 UJ	0.0005 UJ	0.0005 UJ	0.0005 UJ	0.0005 UJ	NA	NA
Cadmium		7440-43-9	0.005	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	**0.00054 J-**	0.0002 UJ	NA	NA
Calcium		7440-70-2		**175 J-**	**175 J-**	**487 J-**	**64.9 J-**	**148 J-**	**203 J-**	NA	NA
Chromium		7440-47-3	0.05	0.001 UJ	**0.00031 J-**	**0.00026 J-**	0.001 UJ	**0.0007 J-**	**0.00037 J-**	NA	NA
Cobalt		7440-48-4		**0.00125 J-**	**0.00119 J-**	**0.00057 J-**	**0.00049 J-**	**0.00018 J-**	**0.00055 J-**	NA	NA
Copper		7440-50-8	0.2	0.001 UJ	0.001 UJ	0.001 UJ	**0.00046 J-**	**0.00372 J-**	**0.00117 J-**	NA	NA
Iron		7439-89-6	0.3	0.05 UJ	0.05 UJ	**0.0382 J-**	0.05 UJ	0.05 UJ	**0.0205 J-**	NA	NA
Lead		7439-92-1	0.025	0.001 UJ	0.001 UJ	0.001 UJ	0.001 UJ	0.001 UJ	0.001 UJ	NA	NA
Magnesium		7439-95-4	35*	**32.9 J-**	**33.2 J-**	**117 J-**	**103 J-**	**228 J-**	**114 J-**	NA	NA
Manganese		7439-96-5	0.3	**1.95 J-**	**2.002 J-**	**3.956 J-**	**0.1371 J-**	**0.1574 J-**	**1.072 J-**	NA	NA
Mercury		7439-97-6	0.0007	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	NA	NA
Nickel		7440-02-0	0.1	**0.00287 J-**	**0.00078 J-**	**0.0012 J-**	**0.00577 J-**	**0.00291 J-**	**0.00095 J-**	NA	NA
Potassium		7440-09-7		**11.8 J-**	**11.9 J-**	**23.3 J-**	**55.3 J-**	**90.5 J-**	**53.1 J-**	NA	NA
Selenium		7782-49-2	0.01	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	NA	NA
Silver		7440-22-4	0.05	0.001 UJ	0.001 UJ	**0.00018 J-**	0.001 UJ	0.001 UJ	0.001 UJ	NA	NA
Sodium		7440-23-5	20	**113 J-**	**113 J-**	**117 J-**	**1200 J-**	**2040 J-**	**967 J-**	NA	NA
Thallium		7440-28-0	0.0005*	0.0005 UJ	0.0005 UJ	0.0005 UJ	0.0005 UJ	0.0005 UJ	0.0005 UJ	NA	NA
Vanadium		7440-62-2		0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	NA	NA
Zinc		7440-66-6	2*	0.01 UJ	0.01 UJ	0.01 UJ	**0.0134 J-**	**0.07332 J-**	0.01 UJ	NA	NA
Total Metals	mg/L										
Aluminum		7429-90-5		**0.434**	**0.531**	**0.332**	**0.0881**	**0.0174**	**0.47**	NA	NA
Antimony		7440-36-0	0.003	0.004 U	0.004 U	0.004 U	0.004 U	**0.0013 J**	**0.00044 J**	NA	NA
Arsenic		7440-38-2	0.025	**0.01054**	**0.01143**	**0.00147**	**0.00064**	**0.00062**	**0.00082**	NA	NA
Barium		7440-39-3	1	**0.01538**	**0.01381**	**0.3888**	**0.7271**	**0.06168**	**2.901**	NA	NA
Beryllium		7440-41-7	0.003*	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	NA	NA
Cadmium		7440-43-9	0.005	0.0002 U	0.0002 U	0.0002 U	0.0002 U	**0.00028 J**	0.0002 U	NA	NA
Calcium		7440-70-2		**182**	**190**	**505**	**69.1**	**149**	**198**	NA	NA
Chromium		7440-47-3	0.05	**0.0013**	**0.00187**	**0.00126**	**0.001**	**0.00098 J**	**0.00262**	NA	NA
Cobalt		7440-48-4		**0.00169**	**0.00191**	**0.0007**	**0.0006**	**0.0002 J**	**0.00081**	NA	NA
Copper		7440-50-8	0.2	**0.00143**	**0.00226**	**0.00076 J**	**0.00527**	**0.00517**	**0.0058**	NA	NA
Iron		7439-89-6	0.3	**34.6**	**37.3**	**24.6**	**2.49**	**0.118**	**37.7**	NA	NA
Lead		7439-92-1	0.025	**0.00068 J**	**0.00065 J**	**0.00183**	**0.00774**	**0.00053 J**	**0.00888**	NA	NA
Magnesium		7439-95-4	35*	**32.3**	**34.8**	**116**	**110**	**227**	**110**	NA	NA
Manganese		7439-96-5	0.3	**2.082**	**2.21**	**4.135**	**0.1436**	**0.164**	**1.124**	NA	NA
Mercury		7439-97-6	0.0007	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 UJ	0.0002 U	NA	NA
Nickel		7440-02-0	0.1	**0.00124 J**	**0.0014 J**	**0.00148 J**	**0.00694**	**0.00285**	**0.0015 J**	NA	NA
Potassium		7440-09-7		**11.7**	**11.9**	**22.7**	**56.7**	**92.4**	**48.9**	NA	NA
Selenium		7782-49-2	0.01	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
Silver		7440-22-4	0.05	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	NA	NA
Sodium		7440-23-5	20	**110**	**116**	**115**	**1250**	**2010**	**981**	NA	NA
Thallium		7440-28-0	0.0005*	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	NA	NA
Vanadium		7440-62-2		**0.00157 J**	**0.00164 J**	**0.00217 J**	0.005 U	0.005 U	**0.00273 J**	NA	NA
Zinc		7440-66-6	2*	0.01 U	**0.00346 J**	**0.00343 J**	**0.05521**	**0.07473**	**0.00456 J**	NA	NA
Hexavalent Chromium	mg/L										
Hexavalent Chromium (Cr VI)		18540-29-9	0.05	0.01 UJ	**0.005 J-**	**0.004 J-**	0.01 UJ	0.01 UJ	**0.013 J-**	NA	NA
Cyanides	mg/L										
Total Cyanide		57-12-5	200	0.005 U	**0.001 J**	**0.002 J**	0.005 U	0.005 U	**0.002 J**	NA	NA

Notes:
Analytes in blue are not detected in any sample
mg/L = milligrams/liter
ng/L = nanogram per liter
ug/L = micrograms per liter or parts per billion (ppb)

BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
PAH = Polycyclic Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
PFAS = Per- and polyfluoroalkyl substances
SVOC = Semi-Volatile Organic Compound
VOC = Volatile Organic Compound

NYS AWQS = New York State Ambient Water Quality Standards and Guidance Values for GA groundwater
* indicates the value is a guidance value and not a standard
** indicates the value is a screening level and not a standard

CAS No. = Chemical Abstracts Service Number
NE = Not Established
NYSDEC = New York State Department of Environmental Conservation

Bolding indicates a detected result concentration

Gray shading and bolding indicates that the detected result value exceeds the NYS AWQS

Data Qualifiers:
+/- = result may be biased high/low, respectively
J = The result is an estimated value.
U = The result was not detected above the reporting limit.
R = The result is rejected.

Table 5. Soil Vapor Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

Analyte	Units	CAS No.	Sample Name / Sample Date / Sample Depth (ft.) / Parent Sample	SV-101 5/14/2018 5	SV-102 5/14/2018 4	SV-103 5/14/2018 8	SV-X 5/14/2018 8 SV-103	SV-104 5/14/2018 8	SV-105 5/14/2018 5	SV-106 5/14/2018 5	SV-107 5/14/2018 6	SV-108 5/14/2018 6	SV-109 5/14/2018 5	SV-103A 11/9/2018 6.5	SV-103B 11/9/2018 6.5	SV-103X 11/9/2018 6.5 SV-103B	SV-103C 11/9/2018 6.5
BTEX	ug/m^3																
Benzene		71-43-2		431 U	**0.687**	12.9 U	12.9 U	**3.55**	**29.6**	**2.73**	**30.4**	**40.6**	**6.36**	**2.25**	**1.03**	3.19 U	3.19 U
Toluene		108-88-3		509 U	**3.92**	15.2 U	15.2 U	**55**	**41.8**	**2.89**	**70.5**	**44.1**	**49.7**	**46.7**	**7.2**	**5.58**	**11.5**
Ethylbenzene		100-41-4		586 U	**1.14**	17.5 U	17.5 U	**28.2**	**46.9**	**1.21**	**25.8**	**8.25**	**19.6**	**4.14**	**2.32 J**	4.34 UJ	4.34 U
o-Xylene		95-47-6		586 U	**1.55**	17.5 U	17.5 U	**49.5**	**77.7**	**2.21**	**34.6**	**15.8**	**27.6**	**4.91**	**3.71 J**	4.34 UJ	**5.13**
m/p-Xylene		179601-23-1		1170 U	**4.26**	35.1 U	35 U	**102**	**95.1**	**3.92**	**96.4**	**29.3**	**76.9**	**15.6**	**8.56 J**	8.69 UJ	**12.1**
Other VOCs	ug/m^3																
Acetone		67-64-1		1610 U	**22.6**	48 U	47.7 U	**496**	**11.3**	2.38 U	**136**	11.9 U	**37.1**	**119**	**37.3**	**32.5**	**30.6**
Allyl chloride (3-Chloropropene)		107-05-1		423 U	0.626 U	12.6 U	12.6 U	0.626 U	0.626 U	0.626 U	0.626 U	3.13 U	0.626 U	1.25 U	0.626 U	3.13 U	3.13 U
Benzyl chloride		100-44-7		699 U	1.04 U	20.9 U	20.9 U	1.04 U	1.04 U	1.04 U	1.04 U	5.18 U	1.04 U	2.07 U	1.04 U	5.18 U	5.18 U
Bromodichloromethane		75-27-4		904 U	1.34 U	27.1 U	27 U	1.34 U	1.34 U	1.34 U	1.34 U	6.7 U	1.34 U	2.68 U	1.34 U	6.7 U	**15.8**
Bromoform		75-25-2		1400 U	2.07 U	41.8 U	41.7 U	2.07 U	2.07 U	2.07 U	2.07 U	10.3 U	2.07 U	4.14 U	2.07 U	10.3 U	10.3 U
Bromomethane		74-83-9		524 U	0.777 U	15.7 U	15.6 U	0.777 U	0.777 U	0.777 U	0.777 U	3.88 U	0.777 U	1.55 U	0.777 U	3.88 U	3.88 U
1,3-Butadiene		106-99-0		299 U	0.442 U	8.94 U	8.92 U	0.442 U	0.442 U	0.442 U	**5.75**	2.21 U	0.442 U	0.885 U	0.442 U	2.21 U	**2.28**
t-Butyl alcohol (Tertiary Butyl Alcohol)		75-65-0		1020 U	**5.37**	30.6 U	30.6 U	**1.6**	**10.2**	1.52 U	**11.2**	7.58 U	**3.46**	**17.7**	**18.6**	**16.2**	**10.7**
Carbon disulfide		75-15-0		420 U	**1.47**	12.6 U	12.5 U	**5.29**	**27.7**	**5.01**	**79.4**	3.11 U	**15.5**	**2.27**	**0.841**	3.11 U	3.11 U
Carbon tetrachloride		56-23-5		849 U	1.26 U	25.4 U	25.4 U	1.26 U	**7.17**	1.26 U	1.26 U	6.29 U	1.26 U	2.52 U	1.26 U	6.29 U	6.29 U
Chlorobenzene		108-90-7		622 U	0.921 U	18.6 U	18.6 U	0.921 U	0.921 U	0.921 U	0.921 U	4.61 U	0.921 U	1.84 U	0.921 U	4.61 U	4.61 U
Chloroethane		75-00-3		356 U	0.528 U	10.7 U	10.6 U	0.528 U	0.528 U	0.528 U	0.528 U	2.64 U	0.528 U	1.06 U	0.528 U	2.64 U	2.64 U
Chloroform (Trichloromethane)		67-66-3		659 U	**1.86**	19.7 U	19.7 U	0.977 U	**3.13**	0.977 U	**2.32**	4.88 U	0.977 U	**4.93**	**64**	**56.6**	**247**
Chloromethane		74-87-3		279 U	0.413 U	8.34 U	8.32 U	0.413 U	0.413 U	0.413 U	**3.45**	2.07 U	**0.681**	0.826 U	0.413 U	2.07 U	2.07 U
Cryofluorane (Freon 114)		76-14-2		944 U	1.4 U	28.2 U	28.2 U	1.4 U	1.4 U	**3.11**	1.4 U	6.99 U	1.4 U	2.8 U	1.4 U	6.99 U	6.99 U
Cyclohexane		110-82-7		**25900**	0.688 U	13.9 U	13.9 U	0.688 U	**49.9**	**41**	**16.3**	**33.1**	**20.1**	1.38 U	0.688 U	3.44 U	3.44 U
Dibromochloromethane		124-48-1		1150 U	1.7 U	34.4 U	34.3 U	1.7 U	1.7 U	1.7 U	1.7 U	8.52 U	1.7 U	3.41 U	1.7 U	8.52 U	8.52 U
1,2-Dibromoethane (EDB)		106-93-4		1040 U	1.54 U	31 U	31 U	1.54 U	1.54 U	1.54 U	1.54 U	7.69 U	1.54 U	3.07 U	1.54 U	7.69 U	7.69 U
1,2-Dichlorobenzene (o-DCB)		95-50-1		812 U	1.2 U	24.3 U	24.2 U	1.2 U	1.2 U	1.2 U	1.2 U	6.01 U	1.2 U	2.4 U	1.2 U	6.01 U	6.01 U
1,3-Dichlorobenzene (m-DCB)		541-73-1		812 U	1.2 U	24.3 U	24.2 U	1.2 U	1.2 U	1.2 U	1.2 U	6.01 U	1.2 U	2.4 U	1.2 U	6.01 U	6.01 U
1,4-Dichlorobenzene (p-DCB)		106-46-7		812 U	1.2 U	24.3 U	24.2 U	1.2 U	1.2 U	1.2 U	1.2 U	6.01 U	1.2 U	2.4 U	1.2 U	6.01 U	6.01 U
Dichlorodifluoromethane (Freon 12)		75-71-8		668 U	**2.02**	20 U	19.9 U	**9.49**	**3.79**	**3.85**	**2.34**	4.94 U	**3.79**	**2.69**	**2.77 J**	4.94 UJ	4.94 U
1,1-Dichloroethane		75-34-3		546 U	0.809 U	16.4 U	16.3 U	0.809 U	0.809 U	0.809 U	0.809 U	4.05 U	0.809 U	1.62 U	0.809 U	4.05 U	4.05 U
1,2-Dichloroethane		107-06-2		546 U	0.809 U	16.4 U	16.3 U	0.809 U	**1.12**	0.809 U	**0.935**	**37**	0.809 U	1.62 U	0.809 U	4.05 U	4.05 U

Table 5. Soil Vapor Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

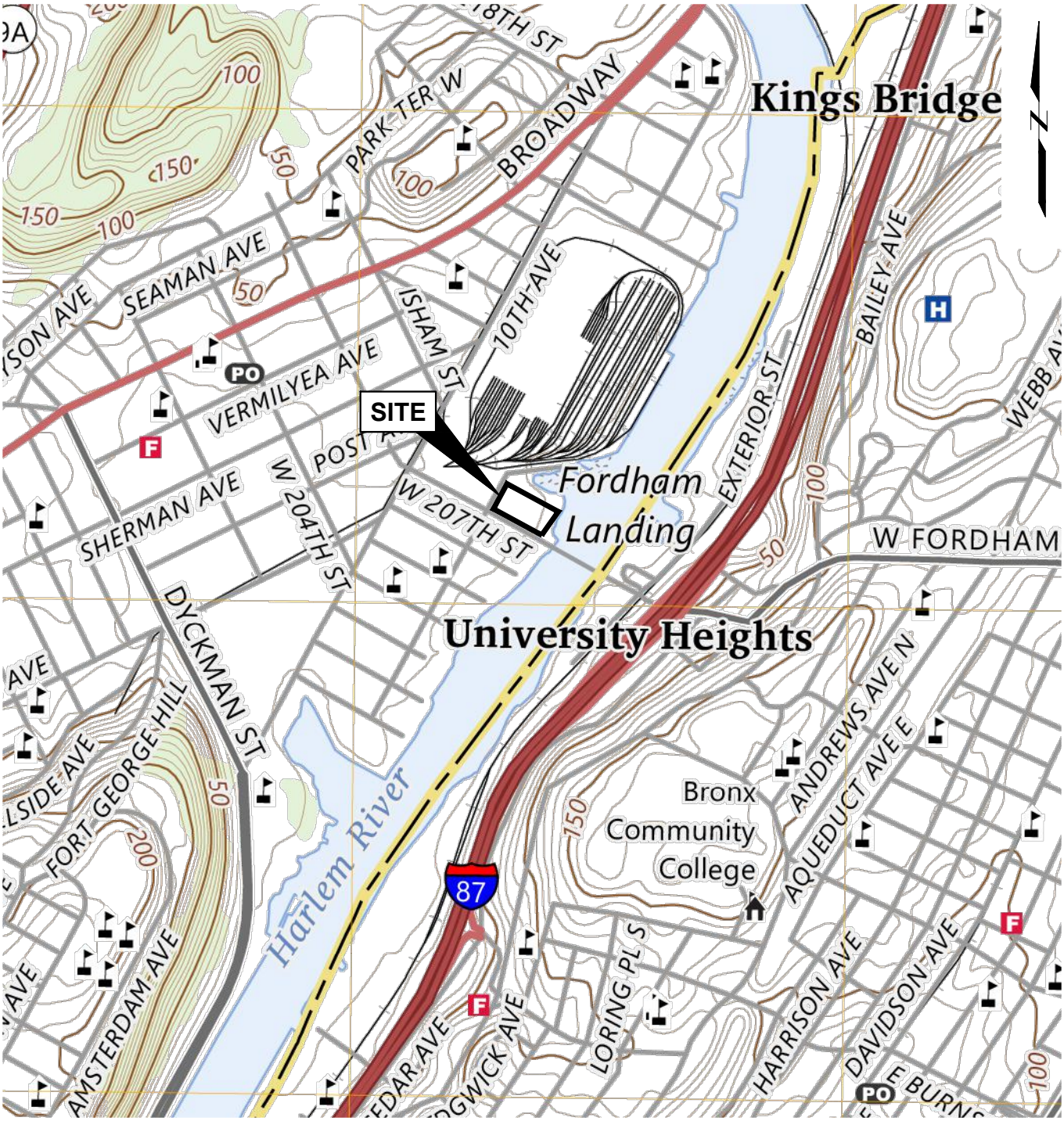
Analyte	Units	CAS No.	Sample Name / Sample Date / Sample Depth (ft.) / Parent Sample: SV-101 5/14/2018 5	SV-102 5/14/2018 4	SV-103 5/14/2018 8	SV-X 5/14/2018 8 SV-103	SV-104 5/14/2018 8	SV-105 5/14/2018 5	SV-106 5/14/2018 5	SV-107 5/14/2018 6	SV-108 5/14/2018 6	SV-109 5/14/2018 5	SV-103A 11/9/2018 6.5	SV-103B 11/9/2018 6.5	SV-103X 11/9/2018 6.5 SV-103B	SV-103C 11/9/2018 6.5
1,1-Dichloroethene		75-35-4	535 U	0.793 U	16 U	16 U	0.793 U	0.793 U	0.793 U	0.793 U	**11.1**	0.793 U	1.59 U	0.793 U	3.96 U	3.96 U
cis-1,2-Dichloroethene		156-59-2	535 U	0.793 U	**245**	**228**	0.793 U	**1.39**	**1.81**	**3.18**	**29.3**	0.793 U	1.59 U	**5.59**	**4.64**	3.96 U
trans-1,2-Dichloroethene		156-60-5	535 U	0.793 U	16 U	16 U	0.793 U	0.793 U	0.793 U	0.793 U	**4.12**	0.793 U	1.59 U	0.793 U	3.96 U	3.96 U
1,2-Dichloropropane		78-87-5	624 U	0.924 U	18.7 U	18.6 U	0.924 U	0.924 U	0.924 U	0.924 U	4.62 U	0.924 U	1.85 U	0.924 U	4.62 U	4.62 U
cis-1,3-Dichloropropene		10061-01-5	613 U	0.908 U	18.3 U	18.3 U	0.908 U	0.908 U	0.908 U	0.908 U	4.54 U	0.908 U	1.82 U	0.908 U	4.54 U	4.54 U
trans-1,3-Dichloropropene		10061-02-6	613 U	0.908 U	18.3 U	18.3 U	0.908 U	0.908 U	0.908 U	0.908 U	4.54 U	0.908 U	1.82 U	0.908 U	4.54 U	4.54 U
1,4-Dioxane		123-91-1	486 U	0.721 U	14.6 U	14.5 U	0.721 U	0.721 U	0.721 U	0.721 U	3.6 U	0.721 U	1.44 U	0.721 U	3.6 U	3.6 U
Ethanol		64-17-5	6370 U	9.42 U	190 U	190 U	**30.9**	9.42 U	9.42 U	9.42 U	47.1 U	9.42 U	**156**	**37.5 J**	47.1 UJ	**52.2**
Ethyl acetate		141-78-6	1220 U	1.8 U	36.4 U	36.4 U	**11**	1.8 U	1.8 U	1.8 U	9.01 U	1.8 U	3.6 U	1.8 U	9.01 U	9.01 U
4-Ethyltoluene (p-Ethyltoluene)		622-96-8	664 U	0.983 U	19.9 U	19.8 U	**24.9**	**21.3**	0.983 U	**9.34**	**5.16**	0.983 U	1.97 U	**1.6**	4.92 U	4.92 U
n-Heptane (C7)		142-82-5	**10200**	0.82 U	16.6 U	16.5 U	**4.75**	**83.2**	**37.3**	**13.7**	**72.5**	**27.3**	**10.7**	0.82 U	4.1 U	4.1 U
1,3-Hexachlorobutadiene (C-46)		87-68-3	1440 U	2.13 U	43.1 U	43 U	2.13 U	2.13 U	2.13 U	2.13 U	10.7 U	2.13 U	4.27 U	2.13 U	10.7 U	10.7 U
n-Hexane (C6)		110-54-3	**12200**	0.705 U	14.2 U	14.2 U	**2.34**	**100**	**65.9**	**23.4**	**113**	**31.1**	**2.19**	0.705 U	3.52 U	3.52 U
2-Hexanone		591-78-6	553 U	0.82 U	16.6 U	16.5 U	**3.44**	0.82 U	0.82 U	0.82 U	4.1 U	0.82 U	**1.86**	**11.8**	**8.89**	**6.56**
Methyl ethyl ketone (2-Butanone)		78-93-3	997 U	1.47 U	29.8 U	29.8 U	**54**	**3.39**	1.47 U	**20.7**	7.37 U	**3.69**	**4.69**	**7.08 J**	7.37 UJ	**8.67**
Methyl tert-butyl ether (MTBE)		1634-04-4	487 U	0.721 U	14.6 U	14.5 U	0.721 U	0.721 U	**707**	0.721 U	**44.3**	0.721 U	1.44 U	0.721 U	3.61 U	3.61 U
4-Methyl-2-pentanone (MIBK)		108-10-1	1390 U	2.05 U	41.4 U	41.4 U	**8.28**	2.05 U	2.05 U	**3.15**	10.2 U	2.05 U	4.1 U	**6.11 J**	10.2 UJ	10.2 U
Methylene chloride		75-09-2	1170 U	**2.16**	35.1 U	35.1 U	1.74 U	1.74 U	1.74 U	1.74 U	8.69 U	1.74 U	3.47 U	1.74 U	8.69 U	8.69 U
2-Propanol (Isopropyl Alcohol)		67-63-0	831 U	1.23 U	24.8 U	24.8 U	**2.28**	1.23 U	1.23 U	**2.38**	6.15 U	**2.24**	**10.9**	**2.15**	6.15 U	6.15 U
Styrene		100-42-5	575 U	0.852 U	17.2 U	17.2 U	0.852 U	0.852 U	0.852 U	0.852 U	4.26 U	0.852 U	1.7 U	0.852 U	4.26 U	4.26 U
1,1,2,2-Tetrachloroethane		79-34-5	927 U	1.37 U	27.7 U	27.7 U	1.37 U	1.37 U	1.37 U	1.37 U	6.87 U	1.37 U	2.75 U	1.37 U	6.87 U	6.87 U
Tetrachloroethene (PCE)		127-18-4	915 U	**17.2**	**2220**	**2780**	**171**	**45.8**	**8.61**	**2.86**	**8.82**	**1.6**	**571**	**1500***	**1550**	**1340**
Tetrahydrofuran		109-99-9	997 U	1.47 U	29.8 U	29.8 U	**31.3**	**5.46**	1.47 U	**4.69**	7.37 U	**2.14**	2.95 U	1.47 U	7.37 U	7.37 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)		76-13-1	1030 U	1.53 U	31 U	30.9 U	1.53 U	1.53 U	1.53 U	1.53 U	7.66 U	1.53 U	3.07 U	1.53 U	7.66 U	7.66 U
1,2,4-Trichlorobenzene		120-82-1	1000 U	1.48 U	30 U	29.9 U	1.48 U	1.48 U	1.48 U	1.48 U	7.42 U	1.48 U	2.97 U	1.48 U	7.42 U	7.42 U
1,1,1-Trichloroethane (TCA)		71-55-6	737 U	1.09 U	22 U	22 U	1.09 U	1.09 U	1.09 U	1.09 U	5.46 U	1.09 U	2.18 U	1.09 U	5.46 U	5.46 U
1,1,2-Trichloroethane		79-00-5	737 U	1.09 U	22 U	22 U	1.09 U	1.09 U	1.09 U	1.09 U	5.46 U	1.09 U	2.18 U	1.09 U	5.46 U	5.46 U
Trichloroethene (TCE)		79-01-6	726 U	**1.84**	**5970**	**6020**	**20.6**	**46.9**	1.07 U	**5.28**	**29.6**	1.07 U	**67.2**	**325**	**284**	**408**
Trichlorofluoromethane (Freon 11)		75-69-4	759 U	**1.34**	22.7 U	22.6 U	**17.4**	**1.28**	1.12 U	**1.33**	5.62 U	1.12 U	**2.43**	**1.6**	5.62 U	5.62 U
1,2,4-Trimethylbenzene		95-63-6	664 U	**2.1**	19.9 U	19.8 U	**98.3**	**72.3**	**3.91**	**38.7**	**20.1**	**47.8**	**4.38**	**9.83 J**	**6.19**	**10.7**
1,3,5-Trimethylbenzene		108-67-8	664 U	**1.03**	19.9 U	19.8 U	**37**	**46.1**	**2.51**	**13.9**	**9.39**	**23**	1.97 U	**2.95 J**	4.92 UJ	4.92 U
2,2,4-Trimethylpentane (iso-Octane)		540-84-1	631 U	0.934 U	18.9 U	18.8 U	**18.1**	**50.9**	**976**	**182**	**869**	**177**	**2.02**	**1.98 J**	4.67 UJ	4.67 U
Vinyl bromide (Bromoethene)		593-60-2	590 U	0.874 U	17.7 U	17.6 U	0.874 U	0.874 U	0.874 U	0.874 U	4.37 U	0.874 U	1.75 U	0.874 U	4.37 U	4.37 U
Vinyl chloride		75-01-4	345 U	0.511 U	**11.3**	**11.4**	0.511 U	0.511 U	**51.4**	**1.03**	**187**	**1.12**	1.02 U	0.511 U	2.56 U	2.56 U

Table 5. Soil Vapor Analytical Results
207th Street/9th Avenue
375 West 207th Street, New York, New York
NYSDEC BCP Site No. C231102

Notes:
Analytes in blue are not detected in any sample
ug/m^3 = micrograms per cubic meter
BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
VOC = Volatile Organic Compound
CAS No. = Chemical Abstracts Service Number
Bolding indicates a detected result concentration

Data Qualifiers:
+/- = result may be biased high/low, respectively
J = The result is an estimated value.
U = The result was not detected above the reporting limit.
R = The result is rejected.

FIGURES



SOURCE:

USGS TOPOGRAPHIC QUADRANGLE, 7.5 MINUTE SERIES: CENTRAL PARK, NY-NJ, 2023
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
10-FOOT CONTOUR INTERVAL

Site Management Plan 207th Street / 9th Avenue 375 West 207th Street, New York, New York	GEI Consultants	SITE LOCATION MAP
J. 207 St LLC and MFC Realty Corp. Floral Park, New York	Project 1801342	July 2024 Fig. 1

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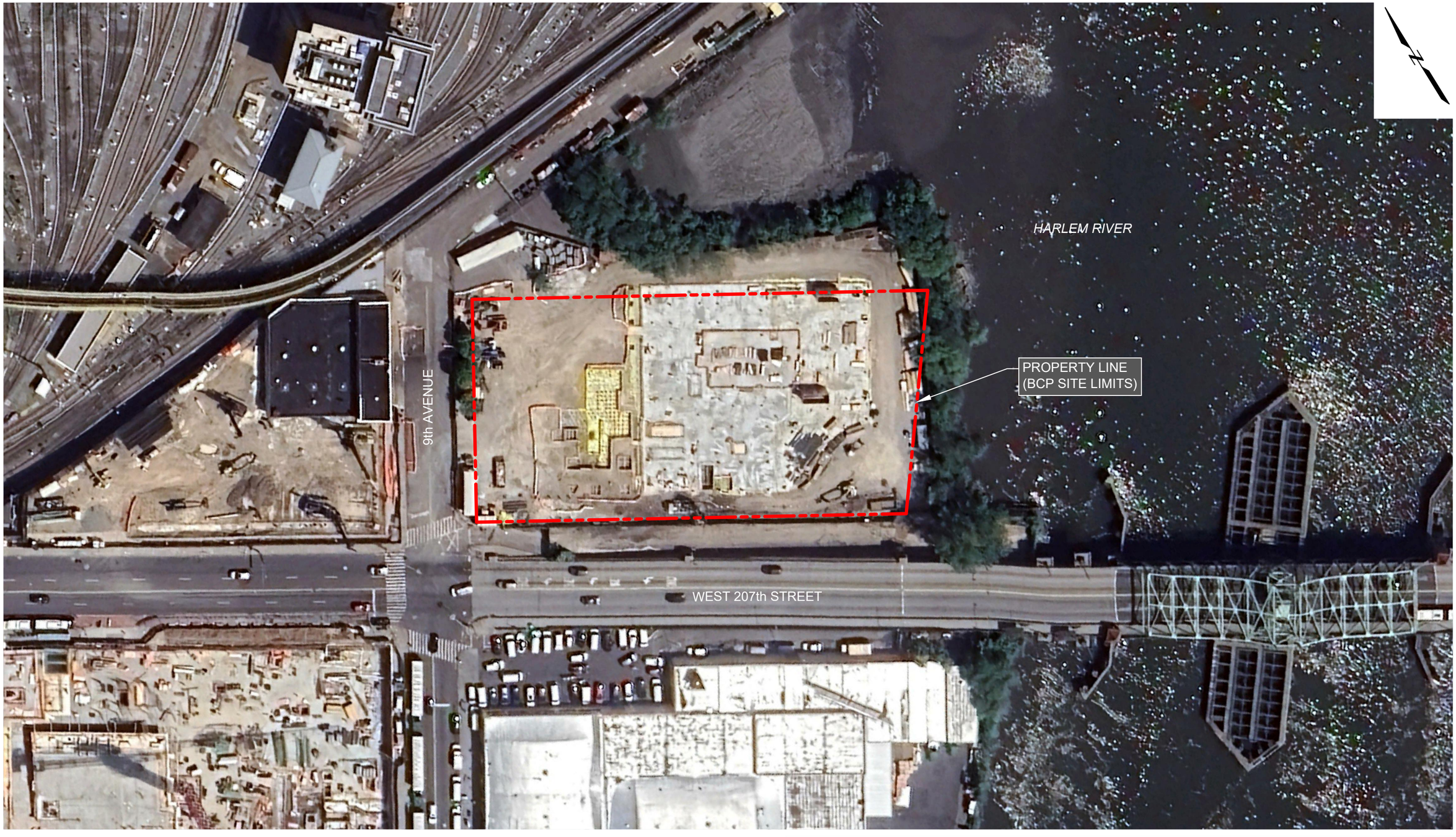


SOURCE:
GOOGLE EARTH PRO, ©2022 GOOGLE LLC,
IMAGE DATE: 05/26/2023.

BLOCK: 2188
LOT: 1

0 80 160
SCALE: 1" = 80'

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

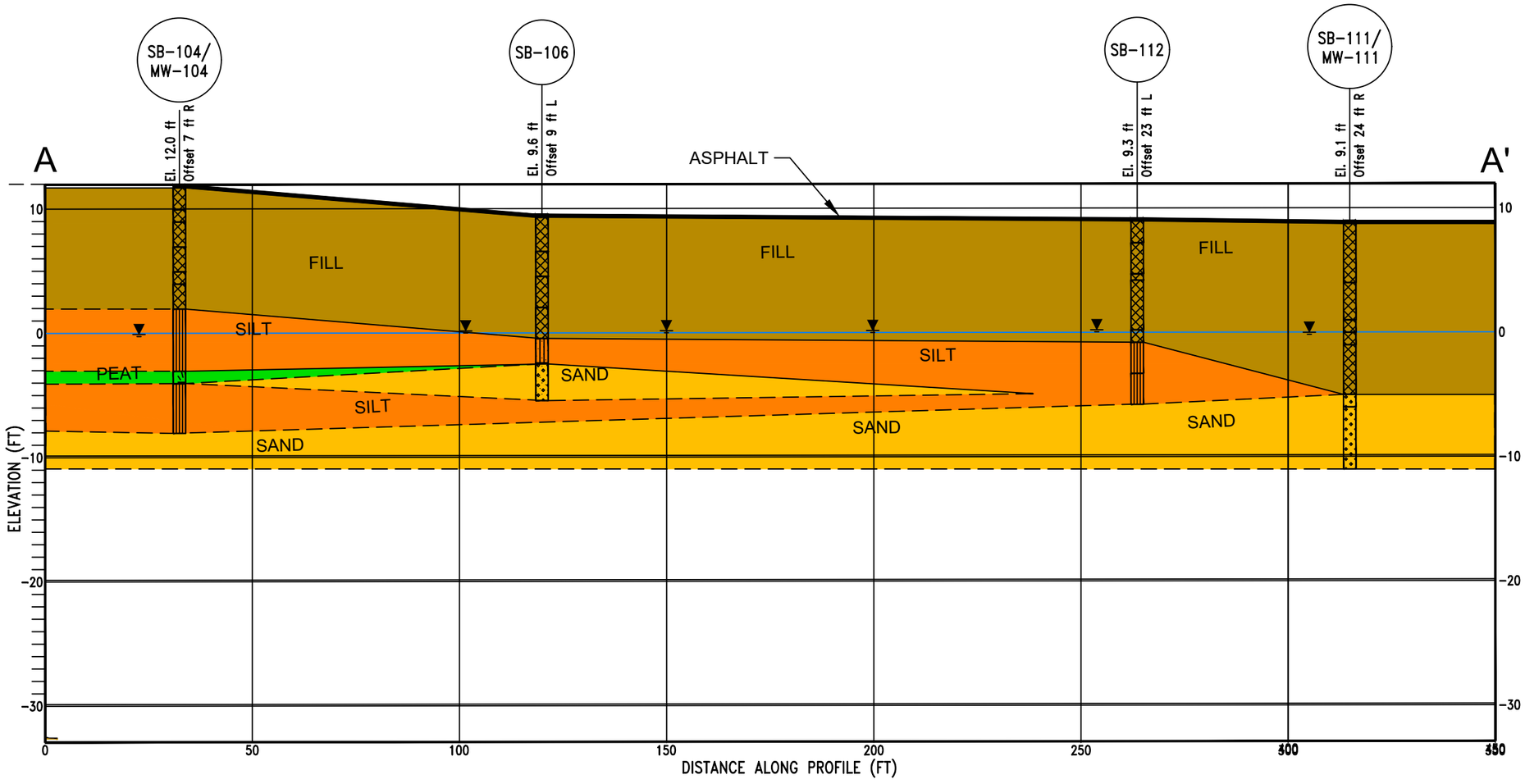
J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

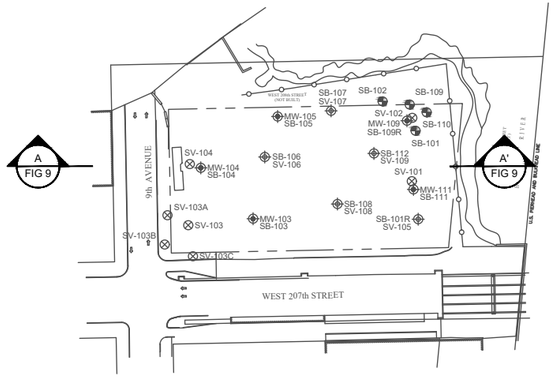
GEI Consultants

SITE LAYOUT MAP

Project 1801342 | July 2024 | Fig. 2

\\bos1v-FS02\ \\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\2_1801342_SMP_SPLN.dwg - 12/6/2023





LEGEND:

- ASPHALT
- FILL
- SAND
- SILT
- PEAT
- CONTACT
- CONTACT (INFERRED)
- WATER TABLE

HORIZONTAL SCALE: 1" = 30'

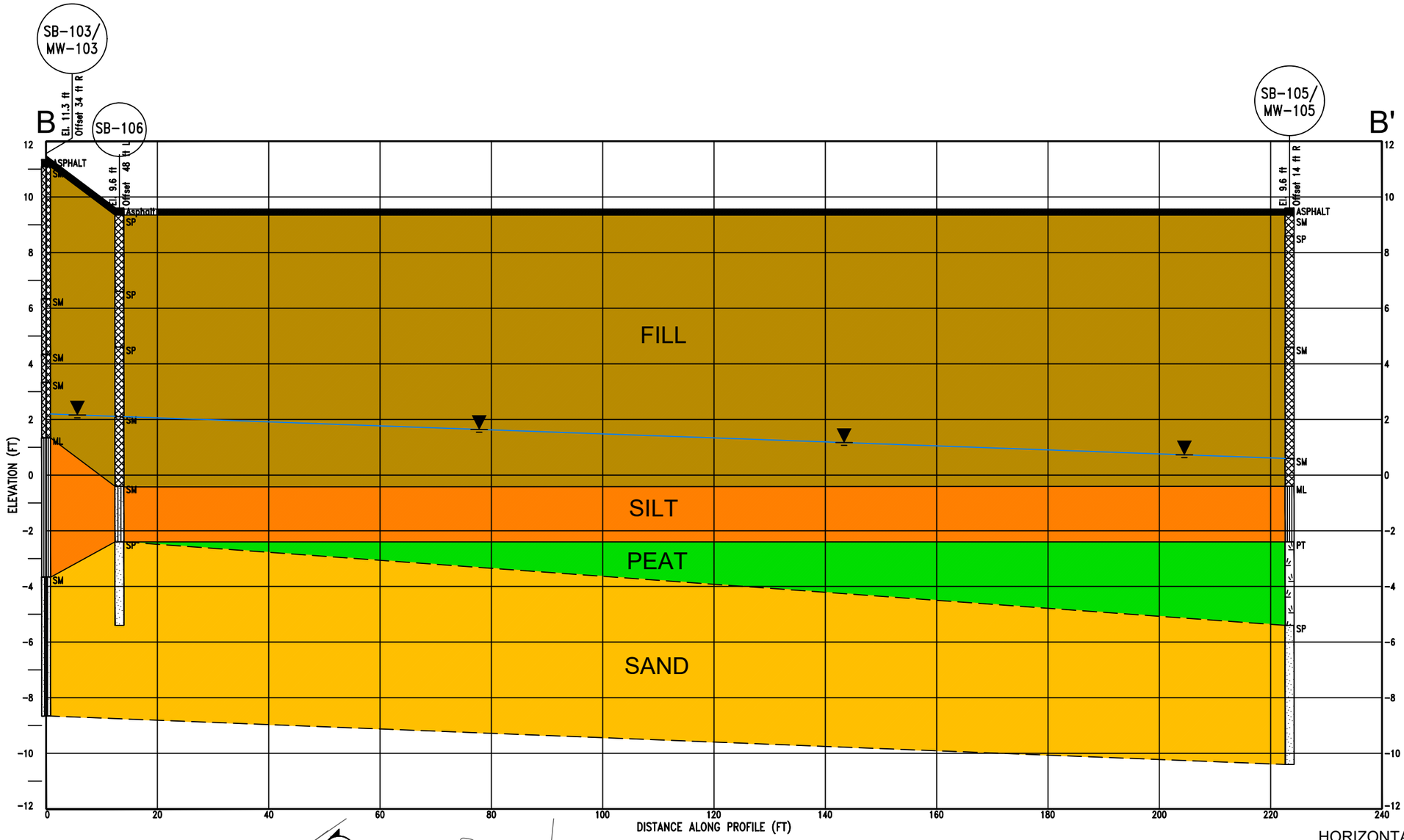
0 30 60

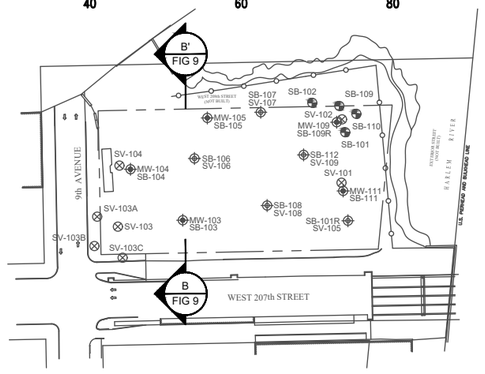
0 10 20

VERTICAL SCALE: 1" = 10'

NOTE: 3x VERTICAL EXAGGERATION

Site Management Plan 207th Street / 9th Avenue 375 West 207th Street, New York, New York	GEI Consultants	GEOLOGIC CROSS SECTION A-A'
J. 207 St LLC and MFC Realty Corp. Floral Park, New York	Project: 1801342	July 2024 Fig. 3





LEGEND:

- ASPHALT
- FILL
- SAND
- SILT
- PEAT
- CONTACT
- CONTACT (INFERRED)
- WATER TABLE

HORIZONTAL SCALE: 1" = 20'

0 20' 40'

0 4' 8'

VERTICAL SCALE: 1" = 4'

NOTE: 5x VERTICAL EXAGGERATION

Site Management Plan 207th Street / 9th Avenue 375 West 207th Street, New York, New York	GEI Consultants	GEOLOGIC CROSS SECTION B-B'
J. 207 St LLC and MFC Realty Corp. Floral Park, New York	Project: 1801342	July 2024 Fig. 4

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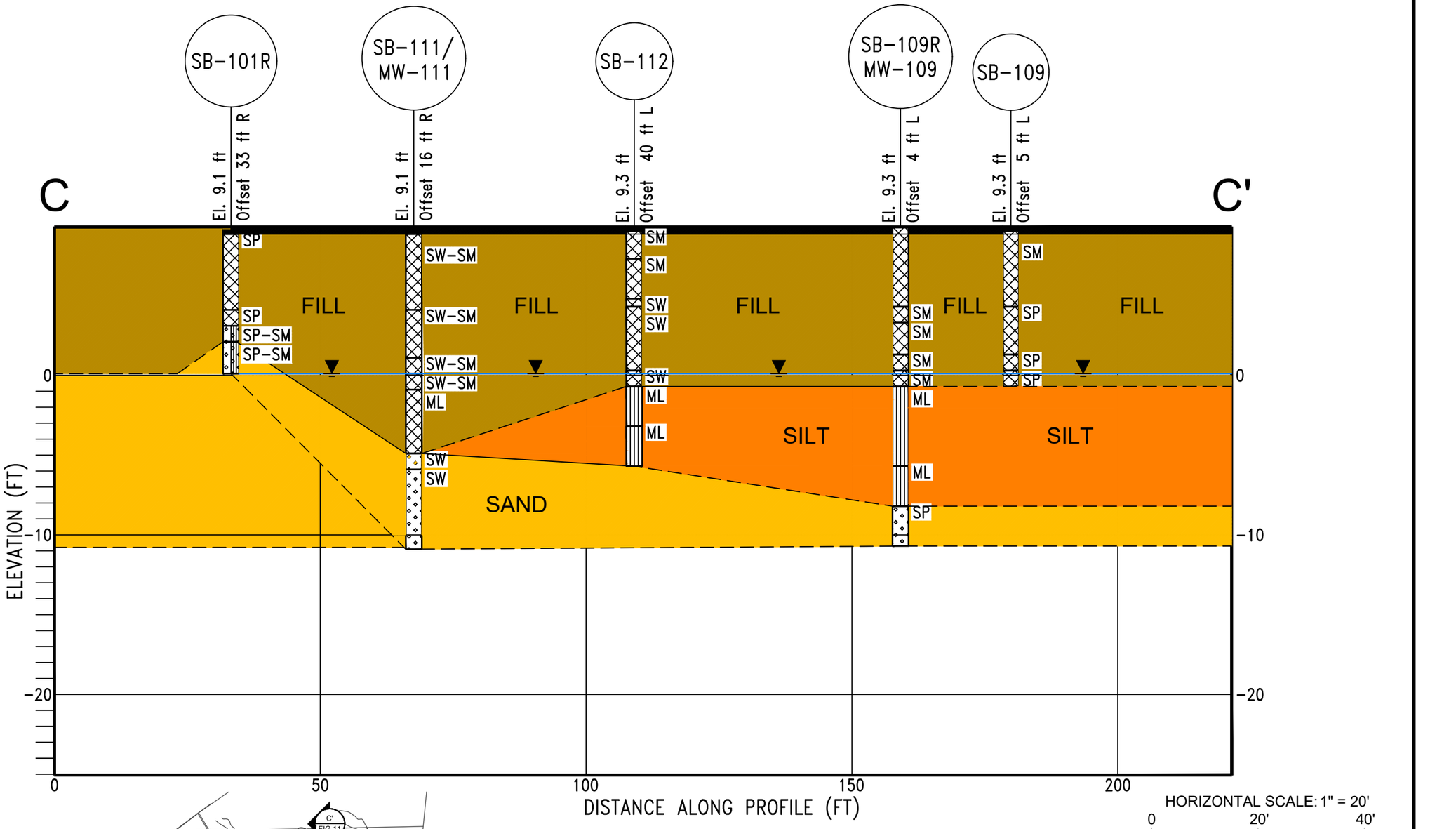
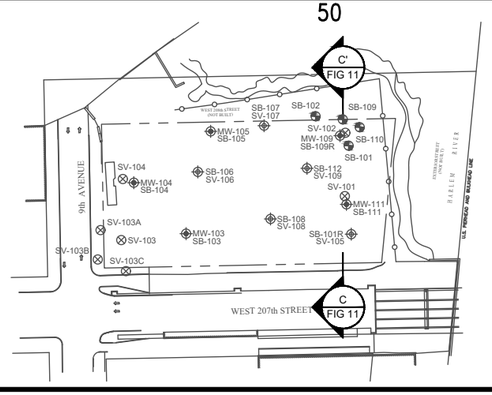




LEGEND:

- ASPHALT
- FILL
- SAND
- SILT
- PEAT
- CONTACT
- CONTACT (INFERRED)
- WATER TABLE

HORIZONTAL SCALE: 1" = 20'
0 20' 40'
0 6.67' 13.33'
VERTICAL SCALE: 1" = 6.67'
NOTE: 3x VERTICAL EXAGGERATION

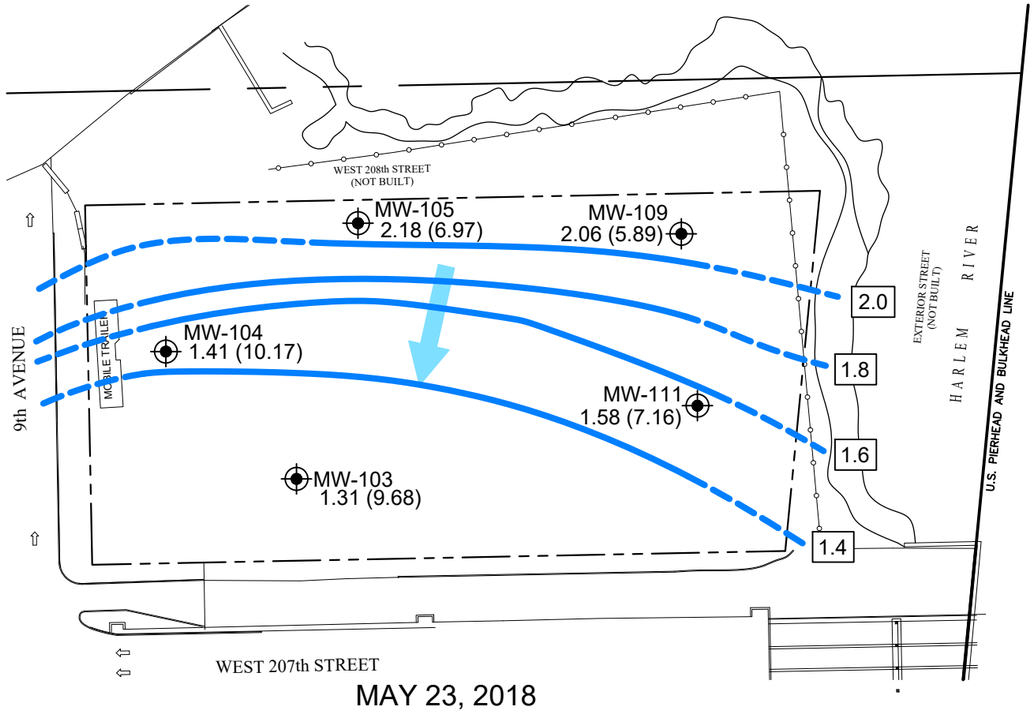
Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

GEI Consultants

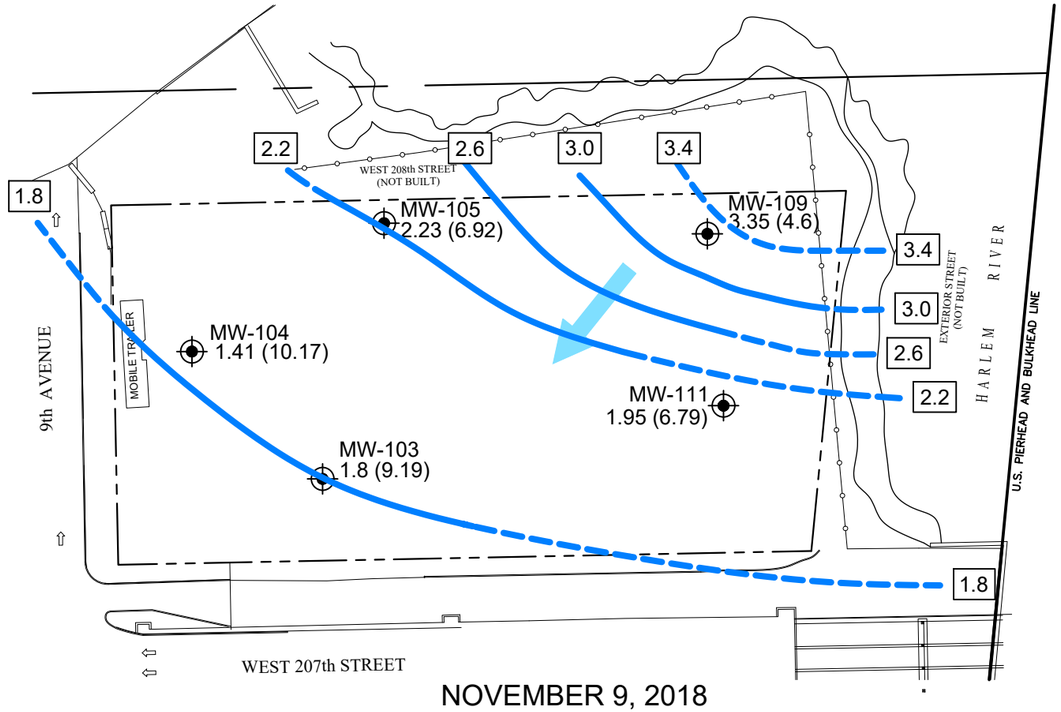
GEOLOGIC CROSS SECTION
C-C'

Project: 1801342 | July 2024 | Fig. 5



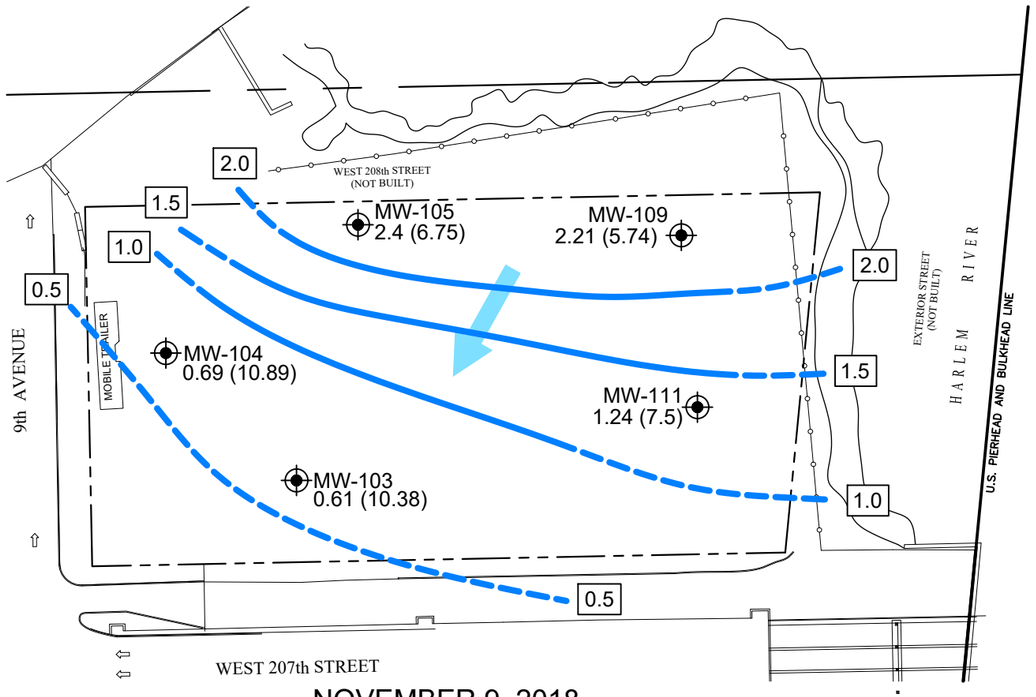
MAY 23, 2018

MID TIME



NOVEMBER 9, 2018

HIGH TIDE



NOVEMBER 9, 2018

LOW TIDE

LEGEND

- ⊕ MONITORING WELL LOCATION
- 1.31 WATER TABLE ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- (9.68) DEPTH TO WATER (FEET BELOW LAND SURFACE)

NOTE: GROUND WATER ELEVATION IS TIDALLY INFLUENCED

0 80 160

SCALE: 1" = 80'

BLOCK: 2188
LOT: 1

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

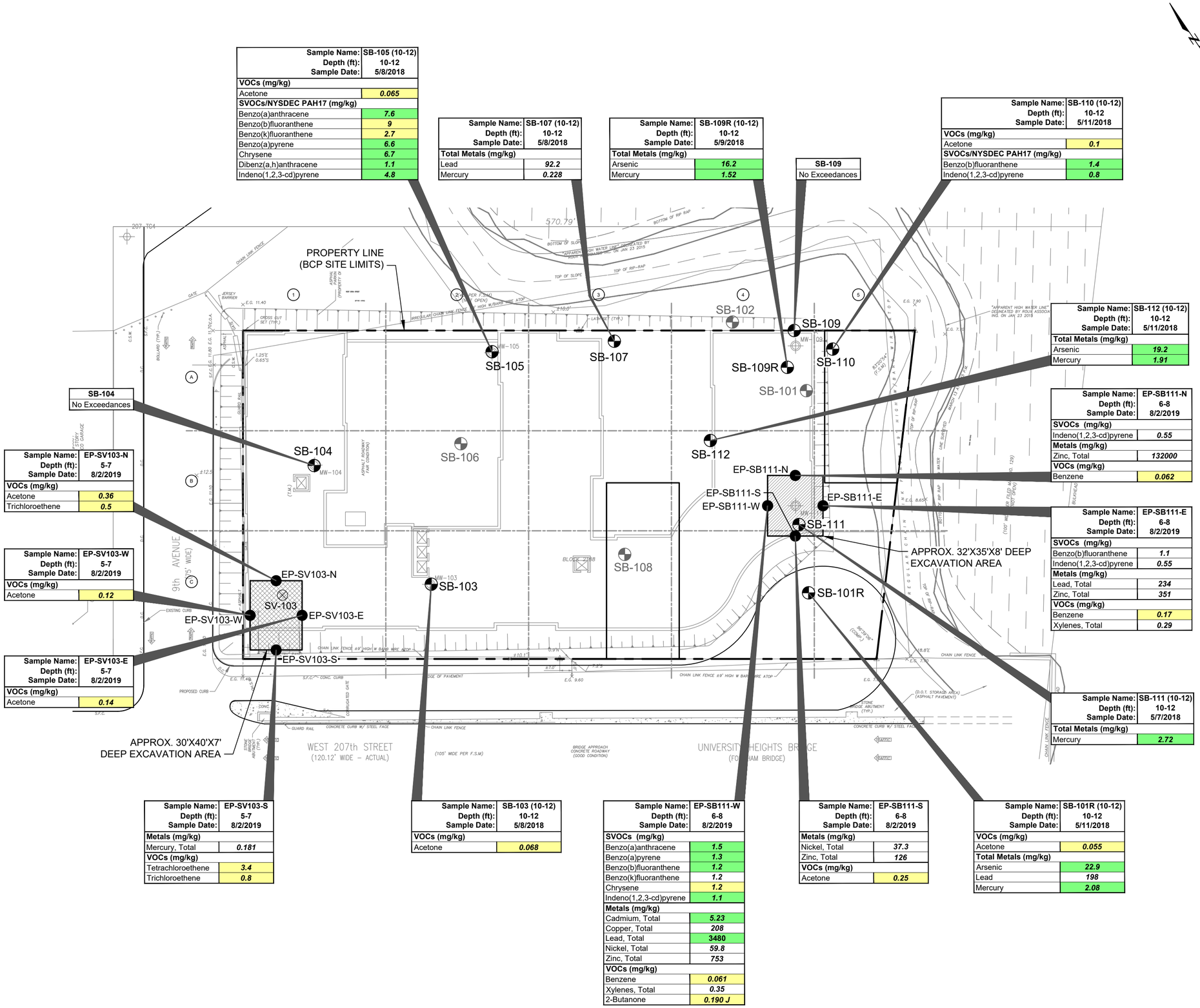
GEI Consultants

Project 1801342

GROUNDWATER CONTOUR MAPS

July 2024 Fig. 6

\\bos1v-FS02\ \\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\6_1801342_SMP_GWC.dwg - 11/3/2023



Sample Name:	SB-105 (10-12)
Depth (ft):	10-12
Sample Date:	5/8/2018
VOCs (mg/kg)	
Acetone	0.065
SVOCs/NYSDEC PAH17 (mg/kg)	
Benzo(a)anthracene	7.6
Benzo(b)fluoranthene	9
Benzo(k)fluoranthene	2.7
Benzo(a)pyrene	6.6
Chrysene	6.7
Dibenz(a,h)anthracene	1.1
Indeno(1,2,3-cd)pyrene	4.8

Sample Name:	SB-107 (10-12)
Depth (ft):	10-12
Sample Date:	5/8/2018
Total Metals (mg/kg)	
Lead	92.2
Mercury	0.228

Sample Name:	SB-109R (10-12)
Depth (ft):	10-12
Sample Date:	5/9/2018
Total Metals (mg/kg)	
Arsenic	16.2
Mercury	1.52

SB-109
No Exceedances

Sample Name:	SB-110 (10-12)
Depth (ft):	10-12
Sample Date:	5/11/2018
VOCs (mg/kg)	
Acetone	0.1
SVOCs/NYSDEC PAH17 (mg/kg)	
Benzo(b)fluoranthene	1.4
Indeno(1,2,3-cd)pyrene	0.8

Sample Name:	SB-112 (10-12)
Depth (ft):	10-12
Sample Date:	5/11/2018
Total Metals (mg/kg)	
Arsenic	19.2
Mercury	1.91

Sample Name:	EP-SB111-N
Depth (ft):	6-8
Sample Date:	8/2/2019
SVOCs (mg/kg)	
Indeno(1,2,3-cd)pyrene	0.55
Metals (mg/kg)	
Zinc, Total	132000
VOCs (mg/kg)	
Benzene	0.062

Sample Name:	EP-SB111-E
Depth (ft):	6-8
Sample Date:	8/2/2019
SVOCs (mg/kg)	
Benzo(b)fluoranthene	1.1
Indeno(1,2,3-cd)pyrene	0.55
Metals (mg/kg)	
Lead, Total	234
Zinc, Total	351
VOCs (mg/kg)	
Benzene	0.17
Xylenes, Total	0.29

Sample Name:	SB-111 (10-12)
Depth (ft):	10-12
Sample Date:	5/7/2018
Total Metals (mg/kg)	
Mercury	2.72

SB-104
No Exceedances

Sample Name:	EP-SV103-N
Depth (ft):	5-7
Sample Date:	8/2/2019
VOCs (mg/kg)	
Acetone	0.36
Trichloroethene	0.5

Sample Name:	EP-SV103-W
Depth (ft):	5-7
Sample Date:	8/2/2019
VOCs (mg/kg)	
Acetone	0.12

Sample Name:	EP-SV103-E
Depth (ft):	5-7
Sample Date:	8/2/2019
VOCs (mg/kg)	
Acetone	0.14

Sample Name:	EP-SV103-S
Depth (ft):	5-7
Sample Date:	8/2/2019
Metals (mg/kg)	
Mercury, Total	0.181
VOCs (mg/kg)	
Tetrachloroethene	3.4
Trichloroethene	0.8

Sample Name:	SB-103 (10-12)
Depth (ft):	10-12
Sample Date:	5/8/2018
VOCs (mg/kg)	
Acetone	0.068

Sample Name:	EP-SB111-W
Depth (ft):	6-8
Sample Date:	8/2/2019
SVOCs (mg/kg)	
Benzo(a)anthracene	1.5
Benzo(a)pyrene	1.3
Benzo(b)fluoranthene	1.2
Benzo(k)fluoranthene	1.2
Chrysene	1.2
Indeno(1,2,3-cd)pyrene	1.1
Metals (mg/kg)	
Cadmium, Total	5.23
Copper, Total	208
Lead, Total	3480
Nickel, Total	59.8
Zinc, Total	753
VOCs (mg/kg)	
Benzene	0.061
Xylenes, Total	0.35
2-Butanone	0.190 J

Sample Name:	EP-SB111-S
Depth (ft):	6-8
Sample Date:	8/2/2019
Metals (mg/kg)	
Nickel, Total	37.3
Zinc, Total	126
VOCs (mg/kg)	
Acetone	0.25

Sample Name:	SB-101R (10-12)
Depth (ft):	10-12
Sample Date:	5/11/2018
VOCs (mg/kg)	
Acetone	0.055
Total Metals (mg/kg)	
Arsenic	22.9
Lead	198
Mercury	2.08

LEGEND:

- SOIL BORING
- END-POINT SAMPLE
- SOIL VAPOR SAMPLE
- EXCAVATION (APPROX 32'X35'X8' DEEP AT MW-111/SB-111)
- EXCAVATION (APPROX 30'X40'X7' DEEP AT SV-103)
- PROPERTY LINE (BCP SITE LIMITS)
- ALPHA-NUMERICAL GRID LINES

Analyte	NYSDEC Unrestricted Use SCO	NYSDEC Protection of Groundwater SCO	NYSDEC Restricted-Residential SCO
VOCs (mg/kg)			
Acetone	0.05	0.05	100
1,2,4-Trimethylbenzene	3.6	3.6	52
2-Butanone	0.12	0.12	100
Benzene	0.06	0.06	4.8
Ethylbenzene	1	1	41
m/p-Xylene	0.26	1.6	100
n-Propylbenzene	3.9	3.9	100
Tetrachloroethene	1.3	1.3	19
Trichloroethene	0.47	0.47	21
Total Xylene	0.26	1.6	100
SVOCs/NYSDEC PAH17 (mg/kg)			
Benzo(a)anthracene	1	1	1
Benzo(b)fluoranthene	1	1.7	1
Benzo(k)fluoranthene	0.8	1.7	3.9
Benzo(a)pyrene	1	22	1
Chrysene	1	1	3.9
Dibenz(a,h)anthracene	0.33	1000	0.33
Indeno(1,2,3-cd)pyrene	0.5	8.2	0.5
Total Metals (mg/kg)			
Arsenic	13	16	16
Barium	350	820	400
Cadmium	2.5	7.5	4.3
Copper	50	1720	270
Lead	63	450	400
Mercury	0.18	0.73	0.81
Nickel	30	130	310
Zinc	109	2480	10000

NOTES:

- mg/kg - milligrams/kilogram or parts per million (ppm)
- SVOC - Semi-Volatile Organic Compound
- NYSDEC - New York State Department of Environmental Conservation
- PAH - Polycyclic Aromatic Hydrocarbon
- VOC - Volatile Organic Compound
- SCO - Soil Cleanup Objectives
- J - The result is an estimated value
- U - The result was not detected above the reporting limit
- NA - Not Analyzed
- NE - No Exceedances of NYSDEC Unrestricted Use SCOs, Protection of Groundwater SCOs or Restricted Residential SCOs

SOURCE:
PLAN BASED ON MAP PREPARED BY MUESER RUTLEDGE CONSULTING ENGINEERS 8/3/2018

0 40 80
SCALE: 1" = 40'

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

GEI Consultants

REMAINING SOIL SAMPLE EXCEEDANCES

Project 1801342 | July 2024 | Fig. 7

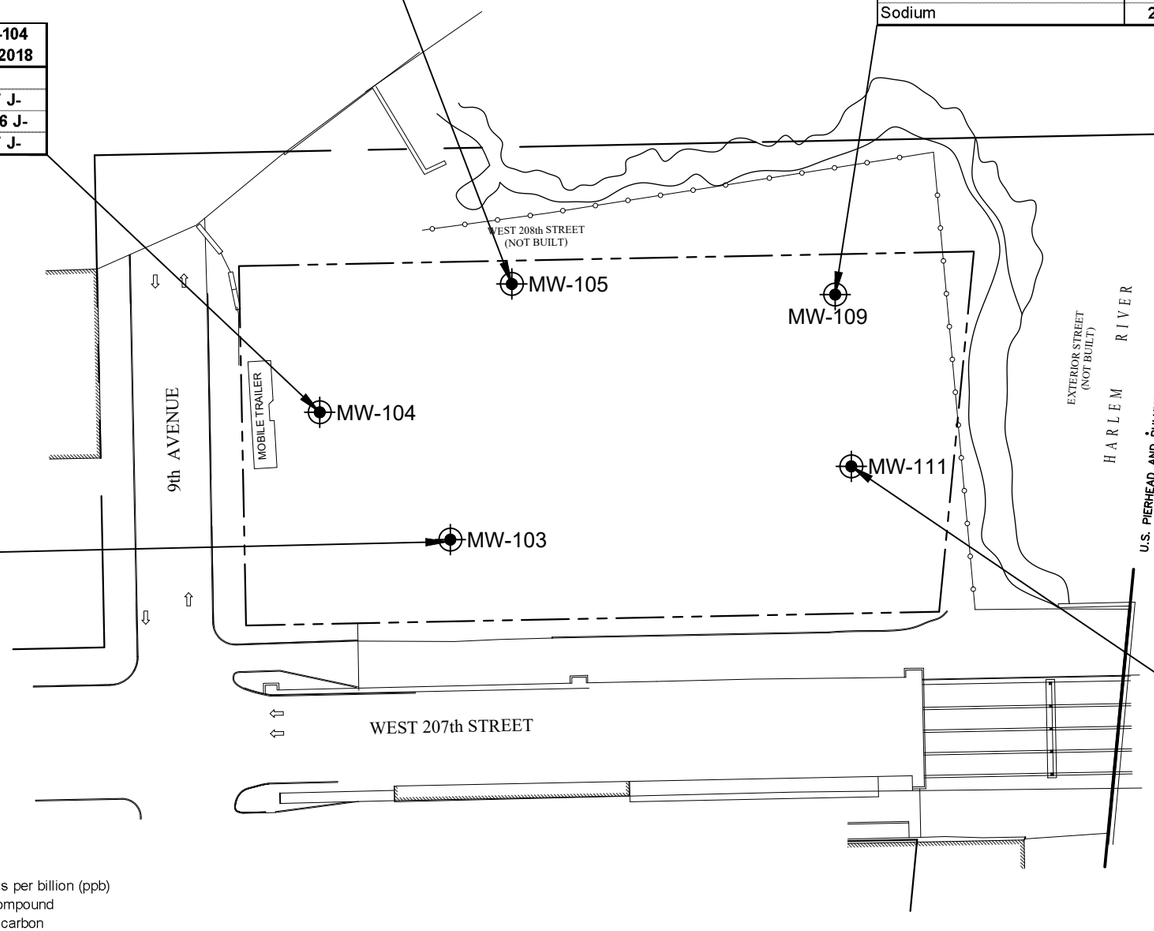
HERIOT, PAULA \\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\7_1801342_SMP_SLEX.dwg - 9/13/2024

Sample Name	MW-105
Sample Date	5/22/2018
PFAS (ng/L)	
Total PFOA + PFOS	86.4 J-
Dissolved Metals (mg/L)	
Magnesium	103 J-
Sodium	1200 J-

Sample Name	MW-109
Sample Date	5/23/2018
Dissolved Metals (mg/L)	
Magnesium	228 J-
Sodium	2040 J-

Sample Name	MW-104
Sample Date	5/22/2018
Dissolved Metals (mg/L)	
Magnesium	117 J-
Manganese	3.956 J-
Sodium	117 J-

Sample Name	MW-103	MW-103 (DUP)
Sample Date	5/22/2018	5/22/2018
VOCs (ug/L)		
cis-1,2-Dichloroethene	67	69
Vinyl chloride	42 J-	44 J-
Dissolved Metals (mg/L)		
Manganese	1.95 J-	2.002 J-
Sodium	113 J-	113 J-



Sample Name	MW-111	MW-111A	MW-111X
Sample Date	5/23/2018	11/9/2018	11/9/2018
VOCs (ug/L)			
Benzene	1.5	NA	NA
Isopropylbenzene	9.5	NA	NA
n-Propylbenzene	20	NA	NA
1,2,4,5-Tetramethylbenzene	22	NA	NA
SVOCs/NYSDEC PAH17 (ug/L)			
Benzo(a)anthracene	0.13	0.06 J	0.05 J
Benzo(b)fluoranthene	0.07 J	ND	ND
Benzo(a)pyrene	0.05 J	ND	ND
Chrysene	0.11	0.06 J	0.05 J
1,4-Dioxane	2.37	NA	NA
PFAS			
Total PFAS	145.7	NA	NA
Dissolved Metals (mg/L)			
Barium	2.288 J-	NA	NA
Magnesium	114 J-	NA	NA
Manganese	1.072 J-	NA	NA
Sodium	967 J-	NA	NA

Analyte	NYS AWQS
VOCs (ug/l)	
Benzene	1
cis-1,2-Dichloroethene	5
Isopropylbenzene	5
n-Propylbenzene	5
1,2,4,5-Tetramethylbenzene	5
Vinyl chloride	2
SVOCs/NYSDEC PAH17 (ug/L)	
1,4-Dixoane	0.035
Benzo(a)anthracene	0.002*
Benzo(b)fluoranthene	0.002*
Benzo(a)pyrene	ND
Chrysene	0.002*
PFAS (ng/L)	
Total PFOA + PFOS	70**
Dissolved Metals (mg/L)	
Barium	1
Iron	0.3
Magnesium	35*
Manganese	0.3
Sodium	20

Notes:
mg/L = milligrams/liter
ng/L = nanogram per liter
ug/L = micrograms per liter or parts per billion (ppb)
SVOC = Semi-Volatile Organic Compound
PAH = Polycyclic Aromatic Hydrocarbon
VOC = Volatile Organic Compound
PFAS = Per- and polyfluoroalkyl substances
NYS AWQS = New York State Ambient Water Quality Standards and Guidance Values for GA groundwater
* indicates the value is a guidance value and not a standard
** indicates the value is a screening level and not a standard
J = The result is an estimated value
J- = The analyte was positively identified; the associated numerical value is an estimated quantity that may be biased low.
NA = Not Analyzed
ND = The guidance value is equal to a detectable concentration
Only exceedances of the NYS AWQS are shown with the exception of metals, where only the dissolved metals exceedances of the NYS AWQS are shown.

LEGEND
MONITORING WELL LOCATION

BLOCK: 2188
LOT: 1

0 80 160
SCALE: 1" = 80'

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

GEI Consultants

Project 1801342

HISTORICAL GROUNDWATER SAMPLE EXCEEDANCES

July 2024 Fig. 8

Sample Name	SV-104
Sample Depth	8 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	3.55
Toluene	55
Ethylbenzene	28.2
o-Xylene	49.5
m/p-Xylene	102
Acetone	496
t-Butyl alcohol (Tertiary Butyl Alcohol)	1.6
Carbon disulfide	5.29
Dichlorodifluoromethane (Freon 12)	9.49
Ethanol	30.9
Ethyl acetate	11
4-Ethyltoluene (p-Ethyltoluene)	24.9
n-Heptane (C7)	4.75
n-Hexane (C6)	2.34
2-Hexanone	3.44
Methyl ethyl ketone (2-Butanone)	54
4-Methyl-2-pentanone (MIBK)	8.28
2-Propanol (Isopropyl Alcohol)	2.28
Tetrachloroethene (PCE)	171
Tetrahydrofuran	31.3
Trichloroethene (TCE)	20.6
Trichlorofluoromethane (Freon 11)	17.4
1,2,4-Trimethylbenzene	98.3
1,3,5-Trimethylbenzene	37
2,2,4-Trimethylpentane (iso-Octane)	18.1

Sample Name	SV-106
Sample Depth	5 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	2.73
Toluene	2.89
Ethylbenzene	1.21
o-Xylene	2.21
m/p-Xylene	3.92
Carbon disulfide	5.01
Cryofluorane (Freon 114)	3.11
Cyclohexane	41
Dichlorodifluoromethane (Freon 12)	3.85
cis-1,2-Dichloroethene	1.81
n-Heptane (C7)	37.3
n-Hexane (C6)	65.9
Methyl tert-butyl ether (MTBE)	707
Tetrachloroethene (PCE)	8.61
1,2,4-Trimethylbenzene	3.91
1,3,5-Trimethylbenzene	2.51
2,2,4-Trimethylpentane (iso-Octane)	976
Vinyl chloride	51.4

Sample Name	SV-107
Sample Depth	6 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	30.4
Toluene	70.5
Ethylbenzene	25.8
o-Xylene	34.6
m/p-Xylene	96.4
Acetone	136
1,3-Butadiene	5.75
t-Butyl alcohol (Tertiary Butyl Alcohol)	11.2
Carbon disulfide	79.4
Chloroform (Trichloromethane)	2.32
Chloromethane	3.45
Cyclohexane	16.3
Dichlorodifluoromethane (Freon 12)	2.34
1,2-Dichloroethane	0.935
cis-1,2-Dichloroethene	3.18
4-Ethyltoluene (p-Ethyltoluene)	9.34
n-Heptane (C7)	13.7
n-Hexane (C6)	23.4
Methyl ethyl ketone (2-Butanone)	20.7
4-Methyl-2-pentanone (MIBK)	3.15
2-Propanol (Isopropyl Alcohol)	2.38
Tetrachloroethene (PCE)	2.86
Tetrahydrofuran	4.69
Trichloroethene (TCE)	5.28
Trichlorofluoromethane (Freon 11)	1.33
1,2,4-Trimethylbenzene	38.7
1,3,5-Trimethylbenzene	13.9
2,2,4-Trimethylpentane (iso-Octane)	182
Vinyl chloride	1.03

Sample Name	SV-109
Sample Depth	5 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	6.36
Toluene	49.7
Ethylbenzene	19.6
o-Xylene	27.6
m/p-Xylene	76.9
Acetone	37.1
t-Butyl alcohol (Tertiary Butyl Alcohol)	3.46
Carbon disulfide	15.5
Chloromethane	0.681
Cyclohexane	20.1
Dichlorodifluoromethane (Freon 12)	3.79
n-Heptane (C7)	27.3
n-Hexane (C6)	31.1
Methyl ethyl ketone (2-Butanone)	3.69
2-Propanol (Isopropyl Alcohol)	2.24
Tetrachloroethene (PCE)	1.6
Tetrahydrofuran	2.14
1,2,4-Trimethylbenzene	47.8
1,3,5-Trimethylbenzene	23
2,2,4-Trimethylpentane (iso-Octane)	177
Vinyl chloride	1.12

Sample Name	SV-102
Sample Depth	4 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	0.687
Toluene	3.92
Ethylbenzene	1.14
o-Xylene	1.55
m/p-Xylene	4.26
Acetone	22.6
t-Butyl alcohol (Tertiary Butyl Alcohol)	5.37
Carbon disulfide	1.47
Chloroform (Trichloromethane)	1.86
Dichlorodifluoromethane (Freon 12)	2.02
Methylene chloride	2.16
Tetrachloroethene (PCE)	17.2
Trichloroethene (TCE)	1.84
Trichlorofluoromethane (Freon 11)	1.34
1,2,4-Trimethylbenzene	2.1
1,3,5-Trimethylbenzene	1.03

Sample Name	SV-103A
Sample Depth	6.5 ft.
Sample Date	11/9/2018
VOCs (ug/m3)	
Benzene	2.25
Toluene	46.7
Ethylbenzene	4.14
o-Xylene	4.91
m/p-Xylene	15.6
Acetone	119
t-Butyl alcohol (Tertiary Butyl Alcohol)	17.7
Carbon disulfide	2.27
Chloroform (Trichloromethane)	4.93
Dichlorodifluoromethane (Freon 12)	2.69
Ethanol	156
n-Heptane (C7)	10.7
n-Hexane (C6)	2.19
2-Hexanone	1.86
Methyl ethyl ketone (2-Butanone)	4.69
2-Propanol (Isopropyl Alcohol)	10.9
Tetrachloroethene (PCE)	571
Trichloroethene (TCE)	67.2
Trichlorofluoromethane (Freon 11)	2.43
1,2,4-Trimethylbenzene	4.38
2,2,4-Trimethylpentane (iso-Octane)	2.02

Sample Name	SV-101
Sample Depth	5 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Cyclohexane	25900
n-Heptane (C7)	10200
n-Hexane (C6)	12200

Sample Name	SV-103B	SV-103X
Sample Depth	6.5 ft.	6.5 ft.
Sample Date	11/9/2018	11/9/2018
VOCs (ug/m3)		
Benzene	1.03	ND
Toluene	7.2	5.58
Ethylbenzene	2.32	ND
o-Xylene	3.71	ND
m/p-Xylene	8.56	ND
Acetone	37.3	32.5
t-Butyl alcohol (Tertiary Butyl Alcohol)	18.6	16.2
Carbon disulfide	0.841	ND
Chloroform (Trichloromethane)	64	56.6
Dichlorodifluoromethane (Freon 12)	2.77	ND
cis-1,2-Dichloroethene	5.59	4.64
Ethanol	37.5	ND
4-Ethyltoluene (p-Ethyltoluene)	1.6	ND
2-Hexanone	11.8	8.89
Methyl ethyl ketone (2-Butanone)	7.08	ND
4-Methyl-2-pentanone (MIBK)	6.11	ND
2-Propanol (Isopropyl Alcohol)	2.15	ND
Tetrachloroethene (PCE)	1500*	1550
Trichloroethene (TCE)	325	284
Trichlorofluoromethane (Freon 11)	1.6	ND
1,2,4-Trimethylbenzene	9.83	6.19
1,3,5-Trimethylbenzene	2.95	ND
2,2,4-Trimethylpentane (iso-Octane)	1.98	ND

Sample Name	SV-103	SV-103 (DUP)
Sample Depth	8 ft.	8 ft.
Sample Date	5/14/2018	5/14/2018
VOCs (ug/m3)		
cis-1,2-Dichloroethene	245	228
Tetrachloroethene (PCE)	2220	2780
Trichloroethene (TCE)	5970	6020
Vinyl chloride	11.3	11.4

Sample Name	SV-103C
Sample Depth	6.5 ft.
Sample Date	11/9/2018
VOCs (ug/m3)	
Toluene	11.5
o-Xylene	5.13
m/p-Xylene	12.1
Acetone	30.6
Bromodichloromethane	15.8
1,3-Butadiene	2.28
t-Butyl alcohol (Tertiary Butyl Alcohol)	10.7
Chloroform (Trichloromethane)	247
Ethanol	52.2
2-Hexanone	6.56
Methyl ethyl ketone (2-Butanone)	8.67
Tetrachloroethene (PCE)	1340
Trichloroethene (TCE)	408
1,2,4-Trimethylbenzene	10.7

Sample Name	SV-108
Sample Depth	6 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	40.6
Toluene	44.1
Ethylbenzene	8.25
o-Xylene	15.8
m/p-Xylene	29.3
Cyclohexane	33.1
1,2-Dichloroethane	37
1,1-Dichloroethene	11.1
cis-1,2-Dichloroethene	29.3
trans-1,2-Dichloroethene	4.12
4-Ethyltoluene (p-Ethyltoluene)	5.16
n-Heptane (C7)	72.5
n-Hexane (C6)	113
Methyl tert-butyl ether (MTBE)	44.3
Tetrachloroethene (PCE)	8.82
Trichloroethene (TCE)	29.6
1,2,4-Trimethylbenzene	20.1
1,3,5-Trimethylbenzene	9.39
2,2,4-Trimethylpentane (iso-Octane)	869
Vinyl chloride	187

Sample Name	SV-105
Sample Depth	5 ft.
Sample Date	5/14/2018
VOCs (ug/m3)	
Benzene	29.6
Toluene	41.8
Ethylbenzene	46.9
o-Xylene	77.7
m/p-Xylene	95.1
Acetone	11.3
t-Butyl alcohol (Tertiary Butyl Alcohol)	10.2
Carbon disulfide	27.7
Carbon tetrachloride	7.17
Chloroform (Trichloromethane)	3.13
Cyclohexane	49.9
Dichlorodifluoromethane (Freon 12)	3.79
1,2-Dichloroethane	1.12
cis-1,2-Dichloroethene	1.39
4-Ethyltoluene (p-Ethyltoluene)	21.3
n-Heptane (C7)	83.2
n-Hexane (C6)	100
Methyl ethyl ketone (2-Butanone)	3.39
Tetrachloroethene (PCE)	45.8
Tetrahydrofuran	5.46
Trichloroethene (TCE)	46.9
Trichlorofluoromethane (Freon 11)	1.28
1,2,4-Trimethylbenzene	72.3
1,3,5-Trimethylbenzene	46.1
2,2,4-Trimethylpentane (iso-Octane)	50.9

WEST 208th STREET
(NOT BUILT)

9th AVENUE

MOBILE TRAILER

WEST 207th STREET

EXTERIOR STREET
(NOT BUILT)

HARLEM RIVER

U.S. PIERHEAD AND BULKHEAD LINE

SV-101
SV-102
SV-103
SV-103A
SV-103B
SV-103C
SV-104
SV-105
SV-106
SV-107
SV-108
SV-109

Notes:

VOC = Volatile Organic Compound

ug/m3 = micrograms per cubic meter

ONLY DETECTIONS ARE SHOWN

LEGEND:

⊗ SOIL VAPOR LOCATION

0 80 160

SCALE: 1" = 80'

BLOCK: 2188
LOT: 1

* - ORIGINAL SAMPLE RESULT WAS 1420 UG/M3, CONCENTRATION EXCEEDED THE RANGE OF THE CALIBRATION CURVE AND/OR LINEAR RANGE OF THE INSTRUMENT. THE REPORTED RESULT IS FROM THE SECOND RUN.

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

GEI Consultants

HISTORICAL SOIL VAPOR SAMPLE EXCEEDANCES

Project 1801342 | July 2024 | Fig. 9

\\bos1v-FS02\ \\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\9_1801342_SMP_SVEX.dwg - 11/3/2023

PROPERTY LINE
(BCP SITE LIMITS)

N

9TH AVENUE

LEGEND:

- MINIMUM OF 24-INCHES CLEAN IMPORTED ITEM 4 STONE (OVER DEMARCATION LAYER) (17,575 sq ft)
- BUILDING FOOTPRINT (54,000 SQ FT)
- PROPERTY LINE (BCP SITE LIMITS)

SOURCE:
PLAN BASED ON MAP PROVIDED BY AUFGANG ARCHITECTS LLC.

0 30 60
SCALE: 1" = 30'

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

GEI Consultants

COVER SYSTEM

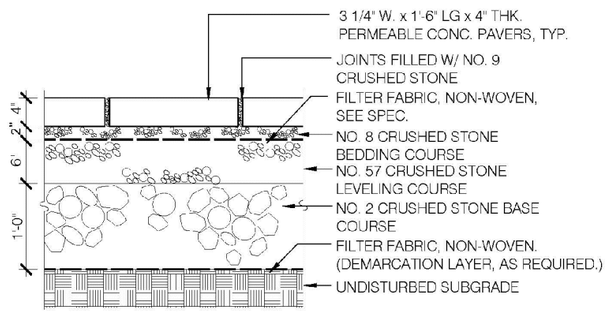
Project 1801342 | July 2024 | Fig. 10

---- B:\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\10_1801342_SMP_COVR.dwg - 6/30/2024

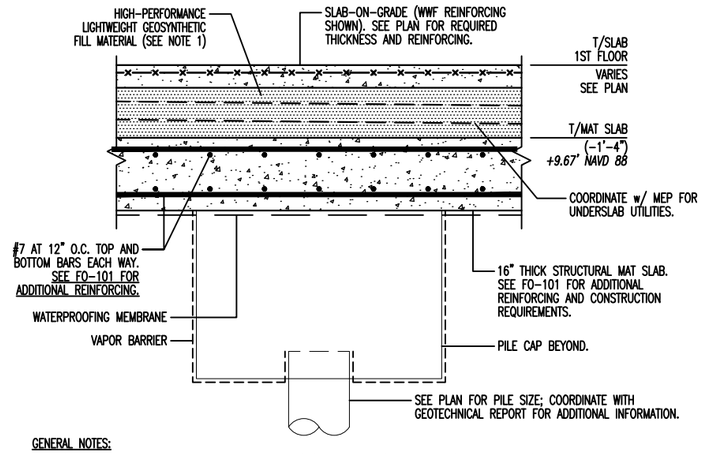
NOTES:
1. CONCRETE PAVERS PER UNILOCK 'ECO-OPTILOC' OR HANOVER PERMEABLE PAVERS, OR APPROVED EQUAL. PRODUCT MANUFACTURER TO BE DETERMINED DURING DESIGN DEVELOPMENT.

2. DIMENSIONS, COLOR, & FINISH OF PERMEABLE CONCRETE PAVERS TO BE DETERMINED DURING DESIGN DEVELOPMENT.

3. PERMEABLE PAVERS ARE TO MEET NYS STORMWATER DESIGN MANUAL MATERIAL SPECIFICATIONS, PER TABLE 5.15, NOTED AS:"VARIED SHAPES AND SIZES, 8%-10% SURFACE OPENING. MANUFACTURER SPECIFICATION, FLOW RATE 5 IN./HR. OR NO LESS THAN 10% VOID."



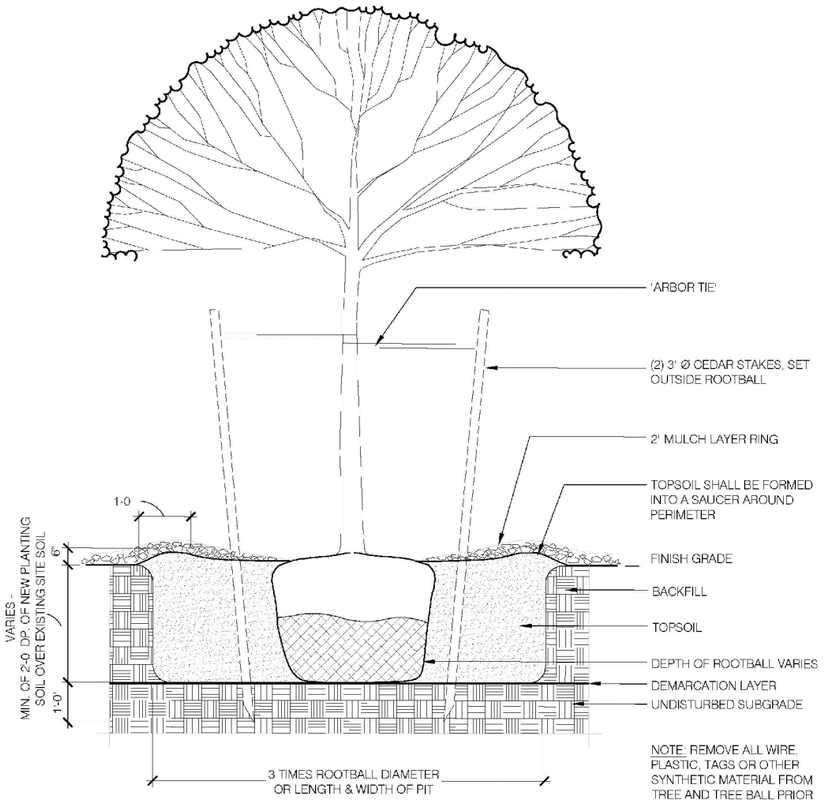
SECTION



GENERAL NOTES:
1. PROVIDE LIGHT-WEIGHT CELLULAR PLASTIC RIGID GEOFOAM AS STRUCTURAL FILL MATERIAL. BASIS OF DESIGN IS EPS29, TYPE IX, BY UNIVERSAL CONSTRUCTION FOAM COMPANY OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ASTM D6817 "STANDARD SPECIFICATION FOR RIGID, CELLULAR POLYSTYRENE GEOFOAM.

TYPICAL SECTION AT 1ST FLOOR SLAB CONSTRUCTION

SCALE: NTS

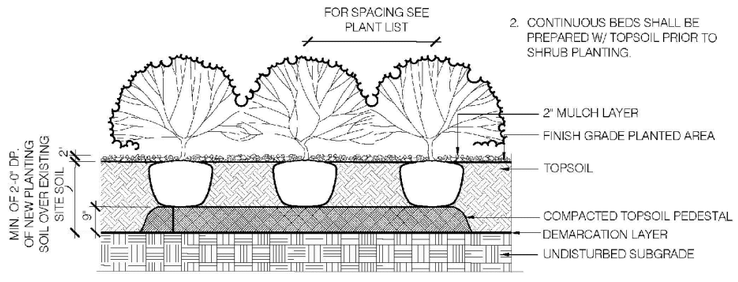


NOTE: REMOVE ALL WIRE, PLASTIC, TAGS OR OTHER SYNTHETIC MATERIAL FROM TREE AND TREE BALL PRIOR TO PLANTING.

TREE PLANTING

NTS

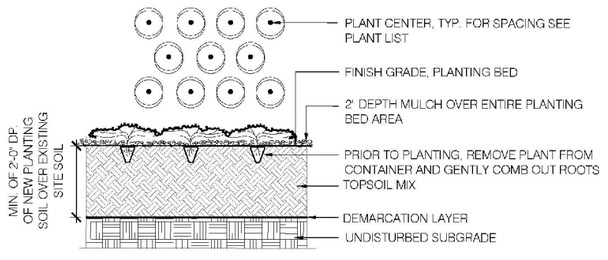
NOTES:
1. REMOVE ALL WIRE, PLASTIC, TAGS OR OTHER SYNTHETIC MATERIAL FROM PLANT PRIOR TO PLANTING.
2. CONTINUOUS BEDS SHALL BE PREPARED W/ TOPSOIL PRIOR TO SHRUB PLANTING.



SHRUB PLANTING

NTS

NOTES:
1. REMOVE ALL WIRE, PLASTIC, TAGS OR OTHER SYNTHETIC MATERIAL FROM PLANT PRIOR TO PLANTING.
2. CONTINUOUS BEDS SHALL BE PREPARED W/ TOPSOIL PRIOR TO PERENNIAL PLANTING.



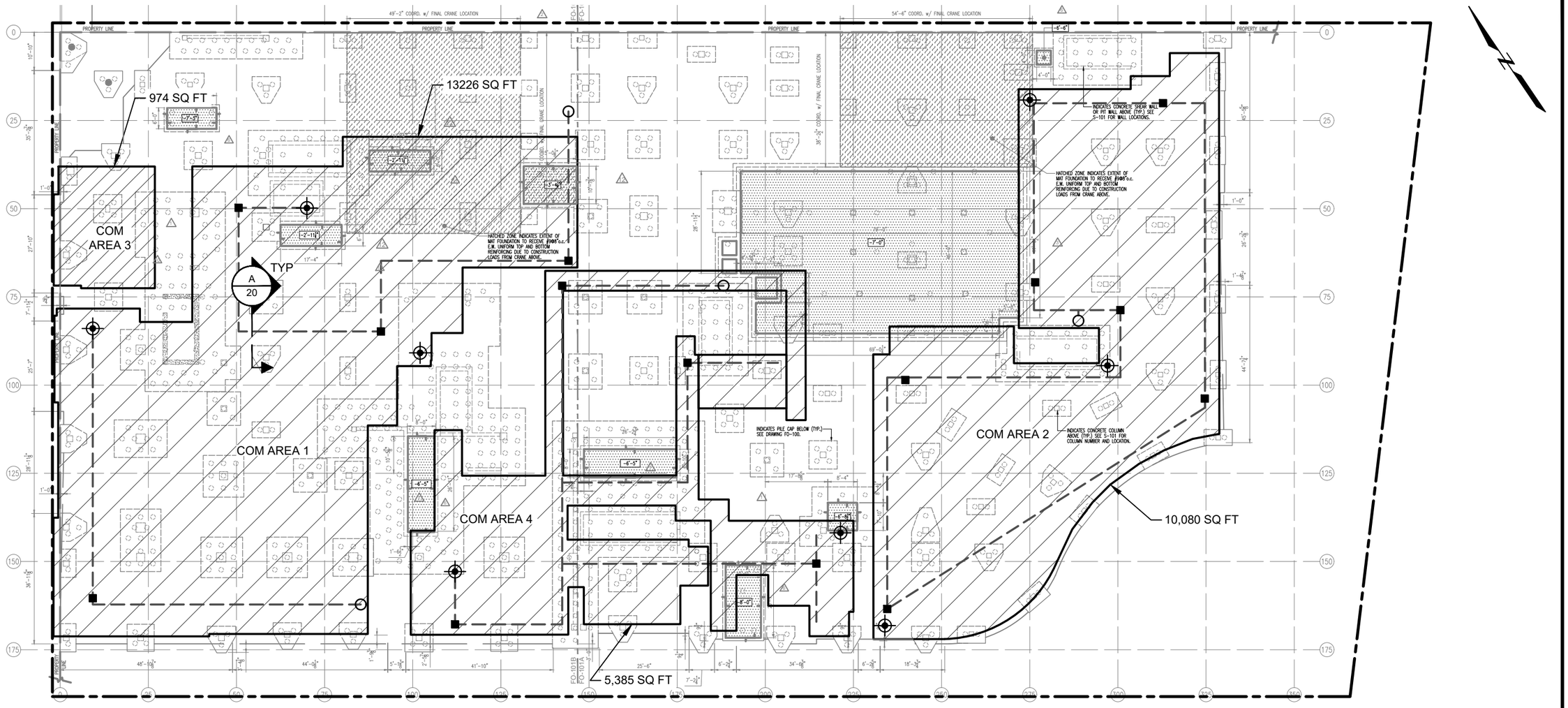
GROUNDCOVER PLANTING

NTS

SOURCE:
PLAN BASED ON DETAILS PROVIDED BY AUFGANG ARCHITECTS LLC.

Site Management Plan 207th Street / 9th Avenue 375 West 207th Street, New York, New York	GEI Consultants	COVER SYSTEM DETAILS
J. 207 St LLC and MFC Realty Corp. Floral Park, New York	Project 1801342	July 2024 Fig. 11

\\bos1v-FS02\ \\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\11_1801342_SMP_CVRD.dwg - 6/30/2024



LEGEND:

- AREA TO BE SERVED BY SUB-SLAB DEPRESSURIZATION SYSTEM
- PROPERTY LINE (BCP SITE LIMITS)
- 20-SLOT SCREEN, SCH 40 PVC SSDS PIPING (4 INCH)
- CLEAN OUT LOCATION
- 4 INCH SCH 40 PVC VENT TO ROOF WITH IN-LINE VENT FAN IF REQUIRED BY NYDEC
- SOIL VAPOR MONITORING POINT (SUB-SLAB) - SEE DETAIL 1 ON FIG. 20 (MUST BE ACCESSIBLE FOR SAMPLING PURPOSES)

SOURCE:
PLAN BASED ON MAP AND DETAILS PROVIDED BY AUFGANG ARCHITECTS LLC DATED 05/26/2023 (FO-101.01) AND JOY CONSTRUCTION.

0 30 60
SCALE: 1" = 30'

Site Management Plan
207th Street / 9th Avenue
375 West 207th Street, New York, New York

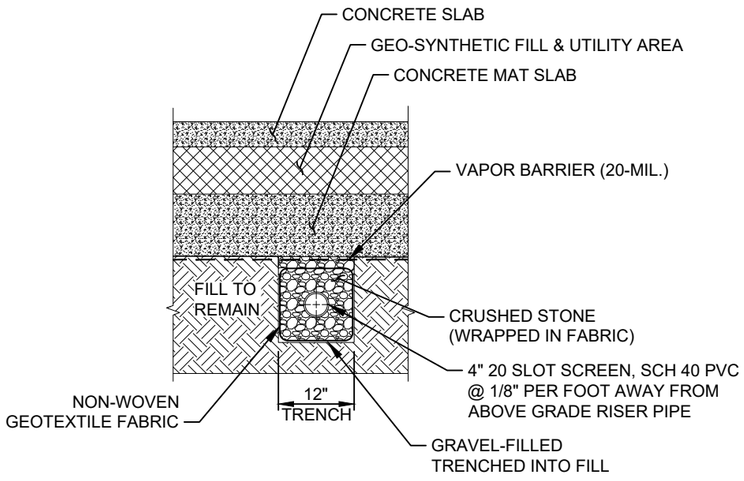
J. 207 St LLC and MFC Realty Corp.
Floral Park, New York

GEI Consultants

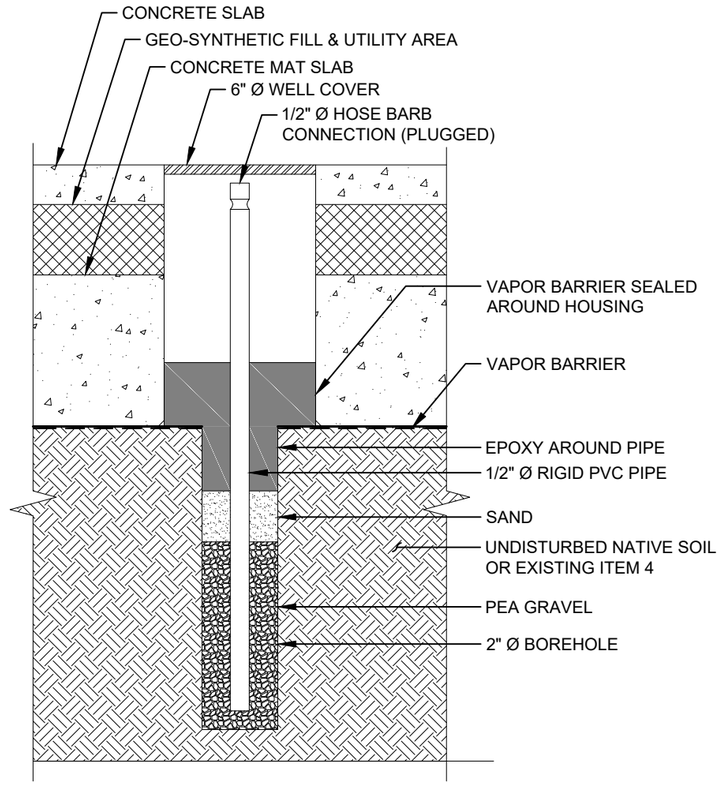
SUB-SLAB DEPRESSURIZATION PIPING AND SUB-SLAB VAPOR SAMPLE LOCATIONS

Project 1801342 | July 2024 | Fig. 12

\\geiconsulta B:\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\12_1801342_SMP_SSDS.dwg - 6/30/2024



A/19 SECTION
TYPICAL TRENCH



1/19 DETAIL
TYPICAL VAPOR MONITORING POINT

Site Management Plan 207th Street / 9th Avenue 375 West 207th Street, New York, New York	GEI Consultants	SUB-SLAB DEPRESSURIZATION SYSTEM DETAILS
J. 207 St LLC and MFC Realty Corp. Floral Park, New York	Project 1801342	July 2024 Fig. 13

\\bos1v-FS02\ \\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\00_CAD\Figures\SMP\13_1801342_SMP_SSDSD.dwg - 12/6/2023

APPENDIX A

ENVIRONMENTAL EASEMENT

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument.The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2021111201484001002EF292

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 12**

Document ID: 2021111201484001 Document Date: 10-25-2021 Preparation Date: 11-23-2021
Document Type: EASEMENT
Document Page Count: 10

PRESENTER:
ULTIMATE ABSTRACT OF NEW YORK
1383 VETERANS MEMORIAL HIGHWAY * SUITE 30
UNYRC4247NY
HAUPPAUGE, NY 11788
631-501-9100
SARA.ROTH@ULTIMATEABSTRACT.COM

RETURN TO:
ULTIMATE ABSTRACT OF NEW YORK
1383 VETERANS MEMORIAL HIGHWAY * SUITE 30
UNYRC4247NY
HAUPPAUGE, NY 11788
631-501-9100
SARA.ROTH@ULTIMATEABSTRACT.COM

PROPERTY DATA

Borough	Block	Lot	Unit	Address
MANHATTAN	2188	1	Entire Lot	3875 9 AVENUE

Property Type: OTHER Easement

CROSS REFERENCE DATA

CRFN_____ *or* DocumentID_____ *or* _____ Year_____ Reel____ Page_____ *or* File Number_____

PARTIES

GRANTOR/SELLER:
HP 3875 NINTH AVENUE HOUSING DEV. FUND. CO. INC.
C/O:. HOUSING PARTNERSHIP DEV. FUND. CORP.,, 253 WEST 35TH STREET, 3RD FLOOR

☒ Additional Parties Listed on Continuation Page

GRANTEE/BUYER:
NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NY 12233

FEES AND TAXES

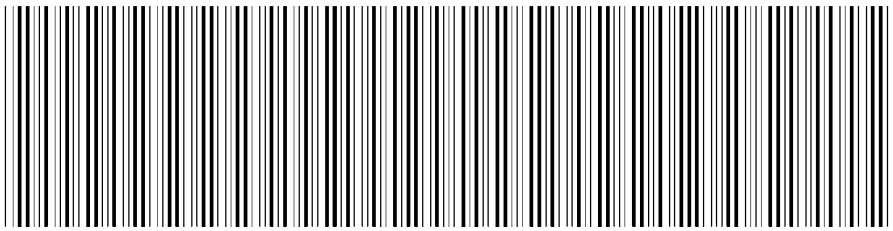
Mortgage :		
Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	87.00
Affidavit Fee:	$	0.00

Filing Fee: $ 100.00
NYC Real Property Transfer Tax: $ 0.00
NYS Real Estate Transfer Tax: $ 0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 12-02-2021 10:39
City Register File No.(CRFN): **2021000473870**

City Register Official Signature

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER



2021111201484001002CF012

RECORDING AND ENDORSEMENT COVER PAGE (CONTINUATION) **PAGE 2 OF 12**

Document ID: 2021111201484001 Document Date: 10-25-2021 Preparation Date: 11-23-2021
Document Type: EASEMENT

PARTIES

GRANTOR/SELLER:
207 STREET OWNER LLC
C/O:. MADDD EQUITIES, 15 VERBANA AVENUE,
SUITE 200
FLORAL PARK, NY 11001

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made as of this 25th day of October, 2021, between Owner(s), HP 3875 Ninth Avenue Housing Development Fund Company, Inc., (the "Grantor Fee Owner") having an office at 253 West 35th Street, 3rd Floor, New York, New York 10001, and 207 Street Owner LLC, (the "Grantor Beneficial Owner), having an office at 15 Verbana Avenue, Suite 200, Floral Park, New York 11001 (collectively, the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor Fee Owner, is the owner of real property located at the address of 3875 9th Avenue in the City of New York, County of New York and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 2188 Lot 1, being the same as that property conveyed to Grantor Fee Owner by deed dated November 26, 2018 and recorded in the City Register of the City of New York as CRFN # 2018000394829. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 1.6426 +/- acres, and is hereinafter more fully described in the Land Title Survey dated June 21, 2014 and last revised June 4, 2021 prepared by Arkadiusz Jusiega, L.L.S. of Arek Surveying P.C., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, Grantor Beneficial Owner, is the owner of the beneficial interest in the Controlled Property being the same as a portion of that beneficial interest conveyed to Grantor

Beneficial Owner by means of a Declaration of Interest and Nominee Agreement dated November 26, 2018 and recorded in City Register of the City of New York as CRFN # 2018000394830; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C231102-11-16, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee

interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C231102
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor Fee Owner has caused this instrument to be signed in its name.

HP 3875 Ninth Avenue Housing Development Fund Company, Inc.:

By: _____

Print Name: Esther Toporovsky

Title: Vice President Date: 10/12/21

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF new york)

On the 12th day of October, in the year 2021, before me, the undersigned, personally appeared Esther Toporovsky, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

MILEIKA BETHANCOURT
Notary Public, State of New York
No. 01BE6220876
Qualified in Kings County
Commission Expires April 19, 2022

IN WITNESS WHEREOF, Grantor Beneficial Owner has caused this instrument to be signed in its name.

207 Street Owner LLC:

By: _____

Print Name: ELI WEISS

Title: Managing Member / authorized Signatory Date: 10/15/21

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF New York)

On the 15th day of October, in the year 2021, before me, the undersigned, personally appeared Eli Weiss, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

Raymond Kimmelman DeVries
Notary Public, State of New York
No. 01KI6295060
Qualified in Queens County
Commission Expires December 23, 2021

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Michael J. Ryan, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 25th day of October in the year 2021 before me, the undersigned, personally appeared Michael J. Ryan, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

Caitlin E. Stephen
Notary Public, State of New York
No. 02ST6338529
Qualified in Albany County
Commission Expires Mar. 14, 2024

SCHEDULE "A" PROPERTY DESCRIPTION

ALL that certain lot, piece or parcel of land, situate, lying and being in the Borough of Manhattan, County, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the northerly side of West 207th Street with the easterly side of Ninth Avenue;

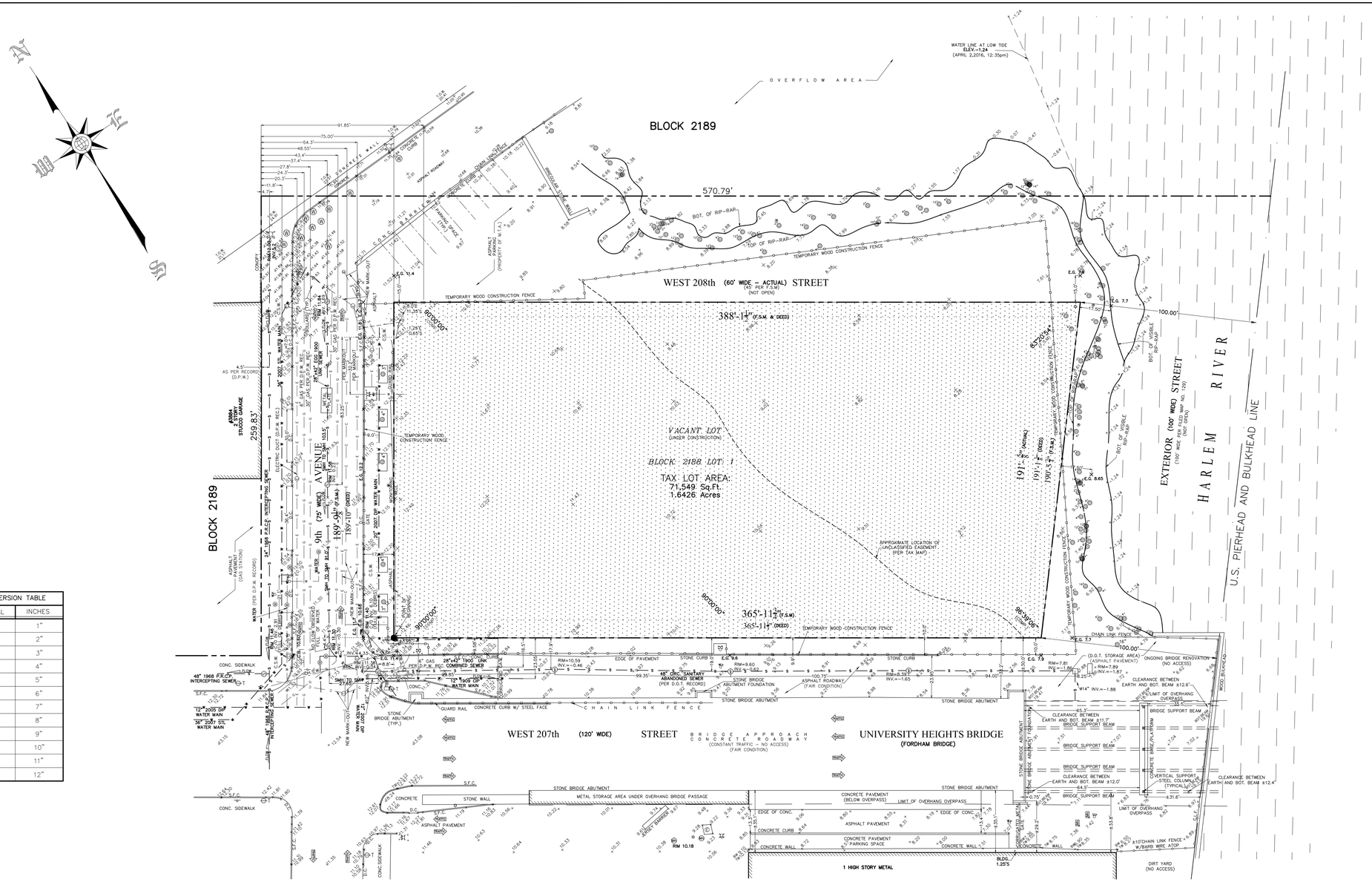
RUNNING THENCE Northerly along the easterly side of Ninth Avenue, 189 feet 10 inches to the southerly side of West 208th Street;

THENCE easterly along the southerly side of West 208th Street, 388 feet 1-1/2 inches to the westerly side of a street 100 feet wide, as shown on a map or plan of Street in the 12th Ward, made by Joseph O.B. Webster, dated November 18, 1888 as map no. 129;

THENCE southerly along the westerly line of said Street, 191 feet 1-3/8 inches to the northerly line of West 207th Street;

THENCE westerly along the northerly line of West 207th Street, 365 feet 11-1/3 inches to the point or place of BEGINNING

Being approximately 1.6426 acres more or less.



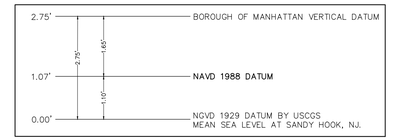
CONVERSION TABLE	
DECIMAL	INCHES
0.08'	1"
0.17'	2"
0.25'	3"
0.33'	4"
0.42'	5"
0.50'	6"
0.58'	7"
0.67'	8"
0.75'	9"
0.83'	10"
0.92'	11"
1.00'	12"

Only copies from the original of this survey marked with an original of the land surveyor's embossed seal shall be considered to be valid true copies.

Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of section 7209, sub-division 2, of the New York State Education Law.

Certification indicated hereon signify that this survey was prepared in accordance with the existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors. Said certifications shall run only to the person for whom the survey is prepared, and on his behalf to the title company, governmental agency and lending institution listed hereon, and to the assignees of the lending institution. Certifications are not transferable to additional institutions or subsequent owner.

VERTICAL DATUM CONVERSION



LEGEND & ABBREVIATIONS:

HR	HANDICAP RAMP		UTILITY & LIGHT POLE
TB	TRAFFIC BOX		UTILITY POLE
SF	STEEL FACE CURB		VENT
RD	ROOF DRAIN		LIGHT POLE
DC	DEPRESSED CURB		FLAG POLE
CB	CATCH BASIN		TRAFFIC SIGN
E.O.P.	EDGE OF PAVEMENT	S	SANITARY MANHOLE
PLNT.	PLANTER	W	WATER MANHOLE
TP	TREE PIT	E	ELECTRIC MANHOLE
CHIM.	CHIMNEY	T	TELEPHONE MANHOLE
T.O.P.	TOP OF PIPE	D	DRAINAGE MANHOLE
B.O.P.	BOTTOM OF PIPE	G	GAS MANHOLE
L.	LANDING	N	D.O.T. MANHOLE
TW	TOP OF WALL	M	EMPIRE CITY SUBWAY MNH.
T.P.	TOP OF PARAPET	U	UNKNOWN MANHOLE
TR.	THRESHOLD		DRAIN
T.CH.	TOP OF CHIMNEY		INLET
T.B.	TOP OF BULKHEAD		MAIL BOX
T.C.	TOP OF CURB		PARKING METER
B.C.	BOTTOM OF CURB		TREE
F.S.M.	FINAL SECTION MAP		SHRUB
	FIRE HYDRANT		WETLAND FLAG
	SPRINKLER	G	GAS LINE
	WATER VALVE	W	WATER LINE
	GAS VALVE	E	ELECTRIC LINE
	OIL VALVE	C	COMMUNICATION LINE
	UNKNOWN VALVE	S	SEWER LINE
T	TRAFFIC LIGHTS		EASEMENT AREA

SURVEY OF PROPERTY LOCATED AT:

#3875 9th AVENUE, MANHATTAN
COUNTY OF NEW YORK
CITY & STATE OF NEW YORK
BLOCK ... 2188, LOT(S) ... 1
D.E.C. SITE No. – C231102

METES AND BOUNDS DESCRIPTION BLOCK: 2188 LOT: 1

ALL THAT CERTAIN LOT, PIECE OR PARCEL OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF MANHATTAN, COUNTY, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE NORTHERLY SIDE OF WEST 207th STREET WITH THE EASTERLY SIDE OF NINTH AVENUE;

RUNNING THENCE NORTHERLY ALONG THE EASTERLY SIDE OF NINTH AVENUE, 189 FEET 10 INCHES TO THE SOUTHERLY SIDE OF WEST 208th STREET;

THENCE EASTERLY ALONG THE SOUTHERLY SIDE OF WEST 208th STREET, 388 FEET 1-1/2 INCHES TO THE WESTERLY SIDE OF EXTERIOR STREET, 100 FEET WIDE, AS SHOWN ON MAP OR PLAN OF STREET IN THE 12th WARD, MADE BY JOSEPH O.B. WEBSTER, DATED NOVEMBER 18, 1888 AS MAP NO. 129;

THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID STREET, 191 FEET 1-3/8 INCHES TO THE NORTHERLY LINE OF WEST 207th STREET;

THENCE WESTERLY ALONG THE NORTHERLY LINE OF WEST 207th STREET, 365 FEET 11-1/3 INCHES TO THE POINT OR PLACE OF BEGINNING.

ALSO KNOWN AS 3875 9th AVENUE, NEW YORK, NY 10034.

LOT AREA: 71,549 SQUARE FEET OR 1.6426 ACRES.

ENVIRONMENTAL EASEMENT METES AND BOUNDS DESCRIPTION DEC SITE No. - C231102

ALL THAT CERTAIN LOT, PIECE OR PARCEL OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF MANHATTAN, COUNTY, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE NORTHERLY SIDE OF WEST 207th STREET WITH THE EASTERLY SIDE OF NINTH AVENUE;

RUNNING THENCE NORTHERLY ALONG THE EASTERLY SIDE OF NINTH AVENUE, 189 FEET 10 INCHES TO THE SOUTHERLY SIDE OF WEST 208th STREET;

THENCE EASTERLY ALONG THE SOUTHERLY SIDE OF WEST 208th STREET, 388 FEET 1-1/2 INCHES TO THE WESTERLY SIDE OF EXTERIOR STREET, 100 FEET WIDE, AS SHOWN ON MAP OR PLAN OF STREET IN THE 12th WARD, MADE BY JOSEPH O.B. WEBSTER, DATED NOVEMBER 18, 1888 AS MAP NO. 129;

THENCE SOUTHERLY ALONG THE WESTERLY LINE OF SAID STREET, 191 FEET 1-3/8 INCHES TO THE NORTHERLY LINE OF WEST 207th STREET;

THENCE WESTERLY ALONG THE NORTHERLY LINE OF WEST 207th STREET, 365 FEET 11-1/3 INCHES TO THE POINT OR PLACE OF BEGINNING.

ALSO KNOWN AS 3875 9th AVENUE, NEW YORK, NY 10034.

LOT AREA: 71,549 SQUARE FEET OR 1.6426 ACRES.

GRAPHIC SCALE – FEET
1" = 30'

0' 30'
30' 15' 60'

GRAPHIC SCALE – METERS
1" = 10 meters

0 10
10 5 20

EASEMENT NOTE:
THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW. THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@DEC.NY.GOV

NOTES:
1. THE OFFSETS OR DIMENSIONS SHOWN HEREON, FROM THE PROPERTY LINES TO THE STRUCTURES ARE FOR A SPECIFIC PURPOSE AND USE. THEREFORE THEY ARE NOT INTENDED TO MONUMENT PROPERTY LINES OR TO GUIDE THE ERECTION OF FENCES, ADDITIONAL STRUCTURES OR ANY OTHER IMPROVEMENTS.
2. CONSULT WITH THE HIGHWAY DEPARTMENT BEFORE DESIGNING, INSTALLING OR MODIFYING ANY NEW OR EXISTING CURBS, WALKS OR ROADWAYS IN THE STREET SHOWN HEREON.
3. SUBSURFACE INFORMATION SHOWN HEREON WAS BASED ON VISUAL OBSERVATIONS, VARIOUS CITY DEPARTMENTS, AND/OR PRIVATE UTILITY COMPANIES RECORDS, AND/OR UTILITY MARK–OUT. THIS SURVEYOR ACCEPTS NO RESPONSIBILITY FOR ANY OF THIS DATA. SUBSURFACE UTILITIES ARE NOT CERTIFIED AS TO THE ACCURACY AND/OR COMPLETENESS.
4. ALL SUBSURFACE UTILITY LOCATION AND DEPTH SHOULD BE RECHECKED AND LEGAL GRADES SHOULD BE VERIFIED WITH THE TOPOGRAPHICAL BUREAU, PREFERABLY IN WRITING BEFORE COMMENCING FINAL DESIGN OR CONSTRUCTION.
5. UTILITIES LABELED AS 'NEW MARK–OUT' IS BASED ON CURRENT MARK–OUT ORDERED TWICE IN JULY 2018, WHICH WAS NOT FULLY COMPLETED BY THIRD PARTIES INVOLVED.
   ALL OTHER UTILITIES ARE SHOWN FROM SURVEY COMPLETED IN 2014 – FILE NUMBER ASC–14241.
6. THIS IS TO CERTIFY THAT THERE ARE NO VISIBLE STREAMS OR NATURAL WATER COURSES IN THE PROPERTY AS SHOWN ON THIS SURVEY.
7. **ELEVATIONS REFER TO THE NAVD 88 VERTICAL DATUM.**
8. REFER TO ARTICLE 36 OF THE GENERAL BUSINESS LAW AND THE PROVISIONS OF INDUSTRIAL CODE PART (RULE NO. 53) BEFORE ANY EXCAVATION OR DEMOLITION IS COMMENCED. THESE LAWS REQUIRE EACH EXCAVATOR TO GIVE ADVANCE NOTICE TO ALL OPERATORS OF UNDERGROUND FACILITIES OF HIS INTENT TO PERFORM EXCAVATION OR DEMOLITION IN THE SPECIFIED AREAS.
9. ALL DIMENSIONS ARE IN U.S. STANDARD MEASUREMENTS.
10. EXISTING GRADES REFER TO TOP OF CURB.
11. EASEMENTS NOT SHOWN ARE NOT GUARANTEED.
12. THIS SURVEY IS FOR BUILDING DEPARTMENT USE ONLY, NOT FOR ANY OTHER PURPOSE.
13. UTILITY MARK–OUT WAS PARTIALLY FADED OUT AND INCOMPLETE. UTILITIES SHOWN ON THIS SURVEY ARE BASED ON FIELD MEASUREMENTS FROM 6–19–20 AND WAS UPDATED BY VISUAL OBSERVATIONS ONLY.

REVISIONS DESCRIPTION	PREPARED BY	DATE	FILE
1. TOPOGRAPHICAL & UTILITY SURVEY	AS CO.	06–21–14	ASC14241
2. PROPERTY STAKEOUT	AS CO.	06–26–14	ASC14241A
3. WETLAND DELINEATION FLAGS & RIP–RAP SURVEY	KS/AR	03–13–15	ASC15124
4. EXPAND TOPOGRAPHICAL SURVEY LIMIT	AS CO.	11–01–15	ASC15124–2
5. LOW TIDE WATER & RIP–RAP ELEVATIONS ADDED	AS CO.	04–02–16	ASC16146–A
6. SURVEYING SERVICES	K.S.	2018	ASC18333
7. SURVEYING SERVICES	K.S.	2019	ASC19148
8. ADDITIONAL ELEVATIONS AROUND NEW ROAD	K.S.	11–18–19	ASC19148–8
9. SURVEY UPDATE FOR SD1 SD2 APPLICATION	K.S.	11–24–20	ASC20051–3
10. SURVEY UPDATE	K.S.	06–04–21	ASC21309

SURVEYED BY
ARKADIUSZ JUSIEGA, P.L.S.
N.Y.S. LIC. NO. 050569

AREK SURVEYING P.C.
10 TAFT PLACE
ALBERTSON, NY 11507
WWW.ASCNY.NET
TEL: (516) 792–6676

Scale: 1" = 30'
Job No: ASC–21309

CERTIFY TO:

ORDERED BY:
MADDD EQUITIES

ENVIRONMENTAL EASEMENT METES AND BOUNDS DESCRIPTION

All that certain lot, piece or parcel of land, situate, lying and being in the Borough of Manhattan, County, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the northerly side of west 207th Street with the easterly side of ninth avenue;

RUNNING THENCE northerly along the easterly side of ninth avenue, 189 feet 10 inches to the southerly side of west 208th street;

THENCE easterly along the southerly side of west 208th street, 388 feet 1-1/2 inches to the westerly side of exterior street, 100 feet wide, as shown on map or plan of street in the 12th ward, made by Joseph O.B. Webster, dated November 18, 1888 as map No. 129;

THENCE southerly along the westerly line of said street, 191 feet 1-3/8 inches to the northerly line of west 207th street;

THENCE westerly along the northerly line of west 207th street, 365 feet 11-1/3 inches to the point or PLACE OF BEGINNING.

Lot area: 71,549 Square Feet or 1.6426 acres.

APPENDIX B

SITE CONTACTS

APPENDIX B – LIST OF SITE CONTACTS

Name	Phone/Email Address
HP Sherman Creek Housing Development Fund Company Inc., Jamie A. Smarr, Site Owner	646-217-3406 jsmarr@housingpartnership.com
1. J.207 ST LLC, Ana Maria Polonia, Remedial Party	516-821-2003 ana@madddequities.com
2. MFC Realty Corp., Ana Maria Polonia, Remedial Party	516-821-2003 ana@madddequities.com
3. 207 Street Owner LLC, Remedial Party, Ana Maria Polonia, Remedial Party	516-821-2003 ana@madddequities.com
4. Sherman Creek Master Tenant LLC, Ana Maria Polonia, Remedial Party	516-821-2003 ana@madddequities.com
5. Sherman Creek Owner LLC, Ana Maria Polonia, Remedial Party	516-821-2003 ana@madddequities.com
6. Sherman Creek LIHTC Owner, LLC, Remedial Party	516-821-2003 ana@madddequities.com
7. HP 3875 Ninth Avenue Housing Development Fund Company, Inc., Remedial Party	646-217-3406 jsmarr@housingpartnership.com
8. HP Sherman Creek Housing Development Fund Co. Inc., Remedial Party	646-217-3406 jsmarr@housingpartnership.com
Wendy Monterosso, Qualified Environmental Professional, GEI Consultants, Inc., P.C.	631-760-9300 wmonterosso@geiconsultants.com
Gary A. Rozmus, P.E., Remedial Engineer, GEI Consultants, Inc., P.C.	631-760-9300 grozmus@geiconsultants.com
Kyle Forster, NYSDEC DER Project Manager	518-402-8644 kyle.forster@dec.ny.gov
Sarah Quandt, P.E., NYSDEC DER Project Manager's Supervisor	518-402-9116 Sarah.Quandt@dec.ny.gov
Kelly Lewandowski, NYSDEC Site Control	518-402-9553 Kelly.lewandowski@dec.ny.gov
Steven Berninger, NYSDOH Project Manager	518-402-7860 steven.berninger@health.ny.gov
George C. D. Duke, Connell Foley, LLP, Remedial Party Attorney	212-307-3700 GDuke@connellfoley.com

APPENDIX C

SOIL BORING LOGS

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT:	J.207 ST LLC
PROJECT:	207th St./9th Avenue
CITY/STATE:	Manhattan, New York
GEI PROJECT NUMBER:	1801884

BORING LOG

PAGE 1 of 1

SB-101

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____
TOTAL DEPTH (FT): 5.0
DRILLED BY: Cascade Drilling / Quincy Brandt
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 5/2/2018 - 5/3/2018
DRILLING DETAILS: Hand Auger / Air Vac/Hand Clear
WATER LEVEL DEPTHS (FT): _____
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	SAMPLE INFO: PEN/REC IN./IN.	SAMPLE INFO: PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	24/2	1.3		SB-101 (0'-2')	(0'- 0.25') dry, Asphalt. (0.25'- 3') NARROWLY GRADED SAND WITH SILT AND GRAVEL (SM); ~80% sand, fine, ~15% fines, ~5% gravel; max. gravel size 0.25, dry, brown, No visual impacts, FILL.
		S2	36/3	0.0			(3'- 5') SILTY SAND WITH GRAVEL (SM); ~80% sand, fine, ~15% fines, ~5% gravel; max. gravel size 0.25, dry, brown, No visual impacts. Asphalt and brick fragments encountered, FILL.
	5						End of Boring at 5 feet.

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC = RECOVERY LENGTH OF SAMPLE
PID = PHOTOIONIZATION DETECTOR READING (PPM)
JHS = JAR HEADSPACE PID READING (PPM)

NA = NOT APPLICABLE
NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT:	J.207 ST LLC
PROJECT:	207th St./9th Avenue
CITY/STATE:	Manhattan, New York
GEI PROJECT NUMBER:	1801884

BORING LOG

PAGE 1 of 1

SB-102

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____
TOTAL DEPTH (FT): 5.0
DRILLED BY: Cascade Drilling / Quincy Brandt
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 5/7/2018 - 5/7/2018
DRILLING DETAILS: Hand Auger / Air Vac/Hand Clear
WATER LEVEL DEPTHS (FT): _____
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	SAMPLE INFO: PEN/REC IN./IN.	SAMPLE INFO: PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	24/2	0.0		SB-102 (0'-2')	(0'- 0.25') dry, Asphalt. (0.25'- 4') SILTY SAND WITH GRAVEL (SM); ~65% sand, fine, ~25% fines, ~10% gravel; max. gravel size 0.5, dry, dark brown, No visual impacts, FILL.
		S2	36/3	0.2			(4'- 5') SILTY SAND WITH GRAVEL (SM); ~65% sand, fine, ~30% fines, ~5% gravel; max. gravel size 0.5, dry, dark brown, No visual impacts. Rock fragments encountered toward 5' bls. Refusal encountered at 5' bls, FILL. End of Boring at 5 feet.
	5						

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL
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JHS = JAR HEADSPACE PID READING (PPM)

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NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc. 110 Walt Whitman Rd. Huntington Station, NY 11746 631-760-9300	CLIENT: J.207 ST LLC	BORING LOG
	PROJECT: 207th St./9th Avenue	PAGE 1 of 1
	CITY/STATE: Manhattan, New York	SB-103/MW-103
	GEI PROJECT NUMBER: 1801884	

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____ TOTAL DEPTH (FT): 20.0
DRILLED BY: Cascade Drilling / Evan Moraits DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett DATE START / END: 5/3/2018 - 5/8/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 7822DT
WATER LEVEL DEPTHS (FT): ▽ 8.00 5/8/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION	WELL DETAILS
	0	S1	60/5	0.0		SB-103 (0'-2')	Dry, Asphalt. (0.25'- 5') SILTY SAND WITH GRAVEL (SM); ~60% sand, fine, ~30% fines, low plasticity, ~10% gravel; max. gravel size 0.25, dry, dark brown, No visual impacts, FILL.	Bentonite
	5	S2	36/1.25	0.0			(5'- 7') SILTY SAND (SM); ~60% sand, fine, ~40% fines, low plasticity; dry, light brown, Chunks of asphalt, no visual impacts, FILL.	
▽		S3	24/1.25	0.2			(7'- 8') SILTY SAND (SM); ~65% sand, fine, ~35% fines; moist, light brown, Chunks of asphalt, no visual impacts, FILL. (8'- 10') SILTY SAND (SM); ~65% sand, fine, ~35% fines; wet, light brown, Chunks of asphalt, no visual impacts, FILL.	
	10	S4	36/3	2.8		SB-103 (10'-12')	(10'- 15') SILT (ML); fine, ~100% fines, low plasticity; wet, dark brown, 5% clay, no visual impacts.	#2 Morie Sand
		S5	24/2	0.1				Schedule 40 PVC 20-Slot Screen
	15	S6	60/5	0.1			(15'- 20') WELL GRADED SAND (SP); ~95% sand, fine, ~5% fines, low plasticity; wet, light brown, 5% silt, no visual impacts.	
	20						End of Boring at 20 feet.	

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL
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JHS = JAR HEADSPACE PID READING (PPM)

NA = NOT APPLICABLE
NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT: J.207 ST LLC
PROJECT: 207th St./9th Avenue
CITY/STATE: Manhattan, New York
GEI PROJECT NUMBER: 1801884

BORING LOG
PAGE 1 of 1
SB-104/MW-104

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ **EASTING (FT):** _____
TOTAL DEPTH (FT): 20.0
DRILLED BY: Cascade Drilling / Evan Moraits
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 4/30/2018 - 5/8/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 7822DT
WATER LEVEL DEPTHS (FT): ▼ 10.00 5/8/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION	WELL DETAILS
	0	S1	60/5	0.0		SB-104 (0'-2')	(0'- 0.25') dry, Asphalt. (0.25'- 2') SILTY SAND WITH GRAVEL (SM); ~60% sand, fine, ~35% fines, ~5% gravel; max. gravel size 0.25, dry, dark brown, No visual impacts, FILL. (2'- 3') SILTY SAND (SM); ~65% sand, fine, ~35% fines; dry, light brown, No visual impacts, FILL. (3'- 5') NARROWLY GRADED SAND (SP); ~90% sand, medium, ~10% gravel; max. gravel size 0.25, dry, black, No visual impacts, FILL.	Bentonite
	5	S2	60/3.5	0.0			(5'- 7') SILT WITH SAND (ML); ~85% fines, ~15% sand, fine; dry, dark brown, No visual impacts. Brick fragments encountered, FILL. (7'- 8') SILT WITH SAND (ML); ~85% fines, ~15% sand, fine; dry, light brown, No visual impacts. Brick fragments encountered, FILL. (8'- 10') SILT WITH SAND (ML); ~85% fines, ~15% sand, fine; moist, dark brown, No visual impacts. Brick fragments encountered, FILL.	
▼	10	S3	24/2	0.0		SB-104 (10'-12')	(10'- 15') SILT WITH SAND (ML); ~90% fines, ~10% sand, fine; wet, dark brown, No visual impacts.	#2 Morie Sand
		S4	24/2	1.3				Schedule 40 PVC 20-Slot Screen
		S5	12/1	0.2				
	15	S6	12/1	0.0			(15'- 16') ORGANIC SOIL (PT); ~100% fines; wet, black, No visual impacts.	
		S7	24/2	0.2			(16'- 20') SILT WITH SAND (ML); ~80% fines, ~20% sand, fine; wet, dark brown, No visual impacts.	
		S8	24/2	0.1				
	20						End of Boring at 20 feet.	

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL
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Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT: J.207 ST LLC
PROJECT: 207th St./9th Avenue
CITY/STATE: Manhattan, New York
GEI PROJECT NUMBER: 1801884

BORING LOG
PAGE 1 of 1
SB-105/MW-105

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ **EASTING (FT):** _____
TOTAL DEPTH (FT): 20.0
DRILLED BY: Cascade Drilling / Evan Moraits
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 5/4/2018 - 5/8/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 7822DT
WATER LEVEL DEPTHS (FT): _____
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION	WELL DETAILS
	0	S1	24/2	1.0		SB-105 (0'-2')	(0'- 0.25') dry, Asphalt. (0.25'- 1') SILTY SAND WITH GRAVEL (SM); ~65% sand, fine, ~30% fines, ~5% gravel; dry, dark brown, No visual impacts, FILL. (1'- 5') NARROWLY GRADED SAND WITH GRAVEL (SP); ~95% sand, fine, ~5% gravel; max. gravel size 0.25, dry, light brown, No visual impacts, FILL.	Bentonite
		S2	36/3	0.3				
	5	S3	30/1.75	0.2			(5'- 9') SILTY SAND (SM); ~65% sand, fine, ~35% fines; dry, dark brown, No visual impacts, some brick fragments, FILL.	
		S4	30/1.75	0.1			(9'- 10') SILTY SAND (SM); ~65% sand, fine, ~35% fines; moist, light brown, No visual impacts, FILL. (10'- 12') SILT (ML); ~100% fines; wet, black, No visual impacts.	
	10	S5	24/2	0.8				#2 Morie Sand
		S6	36/2	0.1			(12'- 15') PEAT (PT); ~100% fines; wet, black, No visual impacts.	Schedule 40 PVC 20-Slot Screen
	15	S7	60/5	0.0			(15'- 20') NARROWLY GRADED SAND (SP); ~100% sand, fine; wet, light brown, No visual impacts.	
	20						End of Boring at 20 feet.	

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC = RECOVERY LENGTH OF SAMPLE
PID = PHOTOIONIZATION DETECTOR READING (PPM)
JHS = JAR HEADSPACE PID READING (PPM)

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NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
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FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT:	J.207 ST LLC
PROJECT:	207th St./9th Avenue
CITY/STATE:	Manhattan, New York
GEI PROJECT NUMBER:	1801884

BORING LOG

PAGE 1 of 1

SB-106

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____ TOTAL DEPTH (FT): 15.0
DRILLED BY: Cascade Drilling / Quincy Brandt DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett DATE START / END: 4/30/2018 - 5/11/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 6061D
WATER LEVEL DEPTHS (FT): 5/4/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	SOIL / BEDROCK DESCRIPTION
	0	S1	60/5	0.0		(0'- 0.25') dry, Asphalt. (0.25'- 3') NARROWLY GRADED SAND WITH GRAVEL (SP); ~90% sand, fine, ~10% gravel; max. gravel size 0.25, dry, light brown, No visual impacts, FILL.
						(3'- 5') NARROWLY GRADED SAND (SP); ~100% sand, medium; dry, black, Metal, crushed brick, rubber parts, FILL.
	5	S2	30/1	0.4		(5'- 7.5') NARROWLY GRADED SAND (SP); ~65% fines, ~35% sand, fine; dry, black, No visual impacts, FILL.
		S3	30/1	0.1		(7.5'- 10') SILT WITH SAND (SM); ~65% fines, ~35% sand, fine; wet, dark brown, No visual impacts, some brick and metal fragments, FILL.
	10	S4	30/1.5	0.8		(10'- 12') SILT WITH SAND (SM); ~90% fines, ~10% sand, fine; wet, dark brown, No visual impacts.
		S5	30/1.5	0.1		(12'- 15') NARROWLY GRADED SAND (SP); ~100% sand, fine; wet, light brown, No visual impacts.
	15					End of Boring at 15 feet.

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL
REC = RECOVERY LENGTH OF SAMPLE
PID = PHOTOIONIZATION DETECTOR READING (PPM)
JHS = JAR HEADSPACE PID READING (PPM)

NA = NOT APPLICABLE
NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc. 110 Walt Whitman Rd. Huntington Station, NY 11746 631-760-9300	CLIENT: J.207 ST LLC PROJECT: 207th St./9th Avenue CITY/STATE: Manhattan, New York GEI PROJECT NUMBER: 1801884	BORING LOG PAGE 1 of 1	SB-107

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____ TOTAL DEPTH (FT): 15.0
DRILLED BY: Cascade Drilling / Quincy Brandt DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett DATE START / END: 5/4/2018 - 5/4/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 6061D
WATER LEVEL DEPTHS (FT): ▼ 10.00 5/11/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	SAMPLE INFO: PEN/REC IN./IN.	SAMPLE INFO: PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	24/2	19.6		SB-105 (0'-2')	(0'- 0.25') dry, Asphalt. (0.25'- 9') SILTY SAND (SM); ~65% fines, ~30% sand, ~5% gravel; max. gravel size 0.25, dry, dark brown to black, No visual impacts, FILL.
		S2	24/2	0.3			
		S3	12/1	0.0			
	5	S4	60/4	0.0			
▼	10	S5	24/2	6.3		SB-105 (10'-12')	(9'- 10') SILTY SAND (SM); ~65% fines, ~35% sand; moist, brown to dark brown, No visual impacts, FILL. (10'- 12') SILT WITH GRAVEL (ML); ~95% fines, ~5% gravel; max. gravel size 0.25, wet, black, No visual impacts, FILL.
		S6	36/2	0.0			(12'- 15') SILT (ML); ~100% fines; wet, black, No visual impacts, FILL.
	15						End of Boring at 15 feet.

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JHS = JAR HEADSPACE PID READING (PPM)

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NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

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TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

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SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc. 110 Walt Whitman Rd. Huntington Station, NY 11746 631-760-9300	CLIENT: J.207 ST LLC PROJECT: 207th St./9th Avenue CITY/STATE: Manhattan, New York GEI PROJECT NUMBER: 1801884	BORING LOG PAGE 1 of 1 SB-108

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____
TOTAL DEPTH (FT): 15.0
DRILLED BY: Cascade Drilling / Quincy Brandt
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 5/7/2018 - 5/7/2018
DRILLING DETAILS: Geoprobe 3230DT / Geoprobe 6061D
WATER LEVEL DEPTHS (FT): ▼ 9.00 5/7/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	SAMPLE INFO: PEN/REC IN./IN.	SAMPLE INFO: PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	60/5	5.8		SB-108 (0'-2)	Asphalt (0.25'- 5') NARROWLY GRADED SAND WITH SILT (SM); ~65% sand, fine, ~35% fines; dry, black, No visual impacts, FILL.
	5	S2	60/4	0.0			(5'- 8') NARROWLY GRADED SAND WITH SILT (SM); ~65% sand, fine, ~35% fines; dry, dark brown, No visual impacts, FILL.
▼							(8'- 9') NARROWLY GRADED SAND WITH SILT (SM); ~65% sand, fine, ~35% fines; moist, dark brown, No visual impacts, FILL. (9'- 10') NARROWLY GRADED SAND WITH SILT (SM); ~65% sand, fine, ~35% fines; wet, dark brown, No visual impacts, FILL.
	10	S3	24/2	2.9		SB-108 (10'-12')	NARROWLY GRADED SAND (SP); ~100% sand, fine; wet, light brown, No visual impacts, FILL.
		S4	36/3	0.0			
	15						End of Boring at 15 feet.

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Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
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SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc. 110 Walt Whitman Rd. Huntington Station, NY 11746 631-760-9300	CLIENT: J.207 ST LLC PROJECT: 207th St./9th Avenue CITY/STATE: Manhattan, New York GEI PROJECT NUMBER: 1801884	BORING LOG PAGE 1 of 1 SB-109

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____ TOTAL DEPTH (FT): 10.0
DRILLED BY: Cascade Drilling / Quincy Brandt DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett DATE START / END: 5/7/2018 - 5/7/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 6061D
WATER LEVEL DEPTHS (FT): ▼ 9.00 5/7/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	SAMPLE INFO: PEN/REC IN./IN.	SAMPLE INFO: PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	60/5	5.0		SB-109 (0'-2')	(0'- 0.25') ASPHALT. (0.25'- 5') SILTY SAND (SM); ~65% sand, fine, ~30% fines, ~5% gravel; max. gravel size 0.25, dry, dark brown, No visual impacts, FILL.
	5	S2	60/3	0.0		SB-109 (8'-10')	(5'- 8') NARROWLY GRADED SAND WITH GRAVEL (SP); ~90% sand, fine, ~10% gravel; max. gravel size 0.25, dry, dark brown, No visual impacts, FILL.
▼							(8'- 9') NARROWLY GRADED SAND WITH GRAVEL (SP); ~90% sand, fine, ~10% gravel; max. gravel size 0.25, moist, dark brown, No visual impacts, FILL. (9'- 10') NARROWLY GRADED SAND WITH GRAVEL (SP); ~90% sand, fine, ~10% gravel; max. gravel size 0.25, wet, dark brown, No visual impacts, FILL.
	10						End of Boring at 10 feet.

NOTES:

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NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
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TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
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ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT: J.207 ST LLC
PROJECT: 207th St./9th Avenue
CITY/STATE: Manhattan, New York
GEI PROJECT NUMBER: 1801884

BORING LOG
PAGE 1 of 1
SB-109R/MW-109

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ **EASTING (FT):** _____
TOTAL DEPTH (FT): 20.0
DRILLED BY: Cascade Drilling / Evan Moraits
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 5/9/2018 - 5/9/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 7822DT
WATER LEVEL DEPTHS (FT): ▼ 10.00 5/9/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	SAMPLE INFO: PEN/REC IN./IN.	SAMPLE INFO: PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION	WELL DETAILS
	0						(0'- 5') No Continuous Sampling.	Bentonite
	5	S1	60/1.75	0.1			(5'- 6') CRUSHED CONCRETE; dry, No visual impacts, FILL. (6'- 8') SILTY SAND (SM); ~65% sand, fine to medium, ~35% fines; dry, dark brown, No visual impacts, FILL. (8'- 9') SILTY SAND (SM); ~65% sand, fine to medium, ~35% fines; moist, dark brown, No visual impacts, FILL. (9'- 10') SILTY SAND (SM); ~60% sand, fine to medium, ~40% fines; wet, dark brown, No visual impacts, FILL.	
▼	10	S2	24/2	3.3		SB-109R (10'-12')	(10'- 15') SILT WITH CLAY (ML); ~100% fines; wet, black, No visual impacts.	#2 Morie Sand Schedule 40 PVC 20-Slot Screen
		S3	12/1	0.1				
		S4	12/1	0.0				
		S5	12/1	0.1				
	15	S6	24/2	2.0			(15'- 17.5') SILT WITH CLAY (ML); ~100% fines; wet, black, No visual impacts.	
		S7	36/3	0.1			(17.5'- 20') SAND (SP); ~100% sand, fine; wet, light brown, No visual impacts.	
	20						End of Boring at 20 feet.	

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JHS = JAR HEADSPACE PID READING (PPM)

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NM = NOT MEASURED
Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
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TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT:	J.207 ST LLC
PROJECT:	207th St./9th Avenue
CITY/STATE:	Manhattan, New York
GEI PROJECT NUMBER:	1801884

BORING LOG

PAGE 1 of 1

SB-110

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____ TOTAL DEPTH (FT): 15.0
DRILLED BY: Cascade Drilling / Evan Moraits DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett DATE START / END: 5/1/2018 - 5/11/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 7822DT
WATER LEVEL DEPTHS (FT): ▼ 10.00 5/11/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	60/5	0.0		SB-110 (0'-2')	(0'- 5') WELL GRADED SAND WITH SILT AND GRAVEL (SM); ~70% sand, fine to medium, ~25% fines, ~5% gravel; max. gravel size 0.25, dry, dark brown to black, No visual impacts, FILL.
	5	S2	30/1.2	14.8			(5'- 7.5') WELL GRADED SAND WITH SILT (SM); ~65% sand, fine to medium, ~35% fines; dry, light brown, No visual impacts, FILL.
		S3	30/1.2	2.3			(7.5'- 10') SILT WITH SAND (ML); ~90% fines, ~10% sand, fine to medium; moist, black, No visual impacts, FILL.
▼	10	S4	30/2	0.0		SB-110 (10'-12')	(10'- 12') WELL GRADED SAND WITH SILT (SP-SM); ~90% sand, fine, ~10% fines; wet, dark brown, No visual impacts.
		S5	30/2	0.9			(12'- 14.5') SILT (ML); ~100% fines; wet, black, No visual impacts.
	15						(14.5'- 15') SILT (ML); ~100% fines; wet, dark brown, No visual impacts. End of Boring at 15 feet.

NOTES:

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Q_P = POCKET PENETROMETER
S_V = TORVANE PEAK

ppm = PARTS PER MILLION
IN. = INCHES
FT. = FEET

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PLO = PETROLEUM LIKE ODOR
TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants

GEI Consultants, Inc.
110 Walt Whitman Rd.
Huntington Station, NY 11746
631-760-9300

CLIENT: J.207 ST LLC
PROJECT: 207th St./9th Avenue
CITY/STATE: Manhattan, New York
GEI PROJECT NUMBER: 1801884

BORING LOG
PAGE 1 of 1
SB-111/ MW-111

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ **EASTING (FT):** _____
TOTAL DEPTH (FT): 20.0
DRILLED BY: Cascade Drilling / Evan Moraits
DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett
DATE START / END: 5/2/2018 - 5/7/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 7822DT
WATER LEVEL DEPTHS (FT): ▼ 9.00 5/7/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	ODOR	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION	WELL DETAILS
	0	S1	24/2	191			SB-111 (0'-2')	(0'- 0.25') Asphalt. (0.25'- 5') NARROWLY GRADED SAND WITH SILT AND GRAVEL (SW); ~80% sand, fine, ~15% fines, ~5% gravel; max. gravel size 0.25, moderate petroleum-like odor, dry, black, Metal, asphalt and brick fragments encountered, FILL.	Bentonite #2 Morie Sand
		S2	36/3	200		PLO			
	5	S3	36/2.5	700		PLO	SB-111 (6'-8')	(5'- 8') SILTY SAND (SM); ~65% sand, fine, ~35% fines; strong petroleum-like odor, dry, black, rock fragments encountered, FILL.	Schedule 40 PVC 20-Slot Screen
▼		S3	24/1.5	300		PLO		(8'- 9') SILTY SAND (SM); ~65% sand, fine, ~35% fines; strong petroleum-like odor, moist, black, rock fragments encountered, FILL.	
						PLO		(9'- 10') SILTY SAND (SM); ~65% sand, fine, ~35% fines; strong petroleum-like odor, wet, black, rock fragments encountered, FILL.	
	10	S3	48/4	291		PLO	SB-111 (10'-12')	(10'- 14') SILT (ML); ~100% fines; strong petroleum-like odor, wet, black.	
	15	S4	12/1	30			SB-111 (14'-15')	(14'- 15') NARROWLY GRADED SAND (SW); ~100% sand, fine; wet, light brown.	
		S5	60/5	0.0				(15'- 20') WIDELY GRADED SAND (SW); ~100% sand, fine to medium; wet, light brown.	
	20							End of Boring at 20 feet.	

NOTES:

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S_V = TORVANE PEAK

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IN. = INCHES
FT. = FEET

NLO = NAPHTHALENE LIKE ODOR
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ALO = ASPHALT LIKE ODOR

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OLO = ORGANIC LIKE ODOR
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MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

GEI Consultants, Inc. 110 Walt Whitman Rd. Huntington Station, NY 11746 631-760-9300	CLIENT: J.207 ST LLC PROJECT: 207th St./9th Avenue CITY/STATE: Manhattan, New York GEI PROJECT NUMBER: 1801884	BORING LOG PAGE 1 of 1 SB-112

LOCATION: 3875 9th Avenue
NORTHING (FT): _____ EASTING (FT): _____ TOTAL DEPTH (FT): 15.0
DRILLED BY: Cascade Drilling / Evan Moraits DATUM VERT. / HORZ.: _____
LOGGED BY: Bill Fitchett DATE START / END: 5/3/2018 - 5/11/2018
DRILLING DETAILS: Geoprobe - Macro Core / Geoprobe 6061D
WATER LEVEL DEPTHS (FT): ▼ 9.00 5/11/2018
GENERAL NOTE: _____

ELEV. FT.	DEPTH FT.	SAMPLE INFO: TYPE and NO.	PEN/REC IN./IN.	PID (PPM)	STRATA	ANALYZED SAMPLE ID	SOIL / BEDROCK DESCRIPTION
	0	S1	24/2	0.6		SB-112 (0'-2')	(0'- 0.25') dry, Asphalt. (0.25'- 2') SILTY SAND WITH GRAVEL (SM); ~65% sand, fine, ~30% fines, ~5% gravel; max. gravel size 0.25, dry, light brown, No visual impacts, FILL.
		S2	36/3	0.2			(2'- 4.5') SILTY SAND WITH GRAVEL (SM); ~65% sand, fine, ~30% fines, ~5% gravel; max. gravel size 0.25, dry, dark brown, No visual impacts, FILL.
	5	S3	30/1.5	4.0			(4.5'- 5') NARROWLY GRADED SAND (SP); ~100% sand, fine; dry, black, asphalt and concrete fragments encountered, FILL. (5'- 9') NARROWLY GRADED SAND (SP); ~100% sand, fine; wet, light brown, brick and asphalt fragments encountered, FILL.
		S4	30/1.5	4.3			
▼	10	S5	30/2	0.8		SB-112 (10'-12')	(9'- 10') NARROWLY GRADED SAND (SP); ~100% sand, fine; wet, light brown, brick and asphalt fragments encountered, FILL. (10'- 12.5') SILT (ML); ~100% fines; wet, dark brown to black, 15% clay.
		S6	30/2	1.0			(12.5'- 15') SILT (ML); ~100% fines; wet, brown, 10% clay.
	15						End of Boring at 15 feet.

NOTES:

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FT. = FEET

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TLO = TAR LIKE ODOR
CLO = CHEMICAL LIKE ODOR
ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR
OLO = ORGANIC LIKE ODOR
SLO = SULFUR LIKE ODOR
MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG_WITH WELL_207TH ST.GPJ_GINT DATA TEMPLATE EXAMPLE.GDT 6/29/18

APPENDIX D – EXCAVATION WORK PLAN (EWP)

This Excavation Work Plan (EWP) will be implemented to address any intrusive activities at the Site that may breach the cover and/or disturb the remaining contamination at the Site. Large-scale intrusive activities may require an additional detailed work plan, such as a RAWP, which must comply with this EWP.

1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the Site's cover system, the Site owner or their representative will notify the NYSDEC contacts listed in the table below. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in Appendix A of the SMP.

Table 1: Notifications*

Kyle Forster, NYSDEC Project Manager	518-402-8644 kyle.forster@dec.ny.gov
Sarah Quandt, P.E., NYSDEC Project Manager's Supervisor	518-402-9116 sarah.quandt@dec.ny.gov
Kelly Lewandowski, NYSDEC Site Control	518-402-9553 Kelly.lewandowski@dec.ny.gov
Steven Berninger, NYSDOH Project Manager	518-402-7860 steven.berninger@health.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for Site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control.

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling.

- A schedule for the work, detailing the start and completion of all intrusive work, and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work.

- A summary of the applicable components of this EWP.

- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P.

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix E of this SMP.

- Identification of disposal facilities for potential waste streams.

- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g., photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section 6 and 7 of this Appendix.

3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence, as necessary. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times 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.

4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site. A Site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all 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 an appropriate manner.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes will be established prior to implementation of any fieldwork. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this Site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

7 MATERIALS REUSE ON-SITE

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or within landscaping berms. Contaminated on-site material may

only be used beneath the Site cover as backfill for subsurface utility lines with prior approval from the DEC project manager.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material 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 Per- and Polyfluoroalkyl Substances (November 2022 or date of current version, whichever is later) guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections 2 and 3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of Site excavation activities and proximity to nearby Site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site.

8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development 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 NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e., a local pond, stream or river) will be performed under a SPDES permit.

9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the RAWP and Decision Document. The existing cover system is comprised of a minimum of 24 inches of Item 4 stone, or clean soil (landscaping areas), concrete covered sidewalks, permeable paver walkways and concrete building foundation. The demarcation layer, consisting of orange snow fencing material, or geotextile fabric will be replaced to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If 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 contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found in Appendix G of the SMP and at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for Restricted Residential Use. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the Site.

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

11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a 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. All necessary repairs will be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP will be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, 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 [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the Site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone within

2 hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

13 COMMUNITY AIR MONITORING PLAN

The CAMP will consist of a real-time monitoring and action level reporting. Air sampling station locations will be chosen based on generally prevailing wind conditions and adjusted on a daily or more frequent basis based on actual wind directions to provide one upwind and at least one downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

13.1 Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

13.2 Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

14 ODOR CONTROL PLAN

Nuisance odors were not noted during implementation of remedial activities at the Site and impacts were at levels well below the safety limits defined in the CAMP. However, this this odor control plan is capable of controlling emissions of nuisance odors off-site if encountered during future disturbance of the Site cover. 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. NYSDEC and NYSDOH will be notified 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 remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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 soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils 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.

15 DUST CONTROL PLAN

Particulate monitoring will be conducted, as needed, according to the Community Air Monitoring Plan (CAMP) provided in Section 13. 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. The remedial party will also take measures listed below to prevent dust production on the Site.

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 using a dedicated 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 sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on 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.

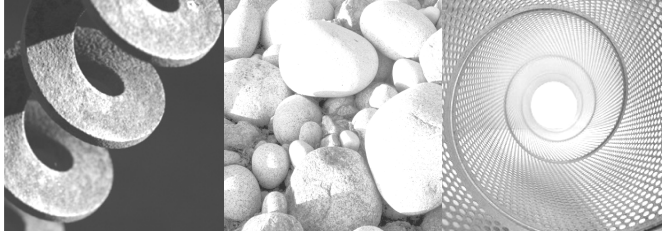
16 OTHER NUISANCES

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

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

APPENDIX E

CONSTRUCTION HEALTH AND SAFETY PLAN



GEI Consultants

Consulting
Engineers and
Scientists

Construction Health and Safety Plan

NYSDEC BCP Site No. C231102
207th Street / 9th Avenue
375 West 207th Street, New York, New York 10034

Submitted to:
J207TH ST / MFC REALTY
15 Verbena Avenue, 2nd Floor
Floral Park, New York, 11001

Submitted by:
GEI Consultants, Inc., P.C.
1000 New York Avenue, Suite B
Huntington Station, NY 11746
631-760-9300

November 2023
Project 1801342

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1. Emergency Contact Information

Table 1. Emergency Contact Information

Important Phone Numbers	
Local Police:	911
Fire Department:	911
Ambulance:	911
Hospital and Occupational Clinic Information *(See Attached Maps and Directions in Appendix A)*	
New York Presbyterian Hospital: 5141 Broadway New York, NY 10034 **AG Urgent Care:** 177 Dyckman Street New York, NY 10040	(212) 932-4000 (646) 918-6220
Contacts	
Project Manager: Wendy Monterosso	(631) 759-2962 office (516) 253-9357 cell
Corporate Health and Safety Officer: Steve Hawkins	(860) 368-5348 office (860) 916-4167 cell
Regional Health and Safety Officer: Jessie Papageorge	(973) 873-7117 office (862) 432-2283 cell
GEI People Team:	(781) 721-4117 Boston (916) 631-4596 Sacramento
Medcor Triage	1-800-775-5866
Client Contact: Maya Hatcher	(516) 821-2042 office
Other Information	
Contractor Requesting/Performing Utility Clearance: Utility Clearance Ticket Number:	TBD To be provided
Nearest Telephone Location (or alternate means of communication)	On-site Cellular

2. Background

Project Name: NYSDEC BCP Site No. C231102
Project Location: 375 West 207th Street, New York, NY 10034
GEI Project No: 1801342

This Construction Health and Safety Plan (CHASP) establishes policies and procedures to protect GEI personnel from the potential hazards posed by the activities at the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site No. C231102, 207th Street/9th Avenue (Site) located at 375 West 207th Street, New York, NY 10034. Reading and sign off (Section 13) of the CHASP is required of on-site GEI personnel and will be reviewed by GEI subcontractors. Subcontractors will prepare their own site-specific CHASP and may use this as a guide. The plan identifies measures to minimize accidents and injuries, which may result from project activities or during adverse weather conditions. A copy of this CHASP will be maintained on site for the duration of the work.

Included in Section 1 and Appendix A is a route to the nearest medical facility from the Site with directions and contact information. Safety data sheets ([SDSs] formerly known as Material Safety Data Sheets [MSDS]), specific to chemicals that may be encountered while working at the Site, are in Appendix B. Appendix C details the signs, symptoms, care and procedures to both heat and cold stress. Appendix D includes the Tailgate Safety Briefing form, the Project Safety Briefing form, the Accident/Incident Report Form and the Near Miss Reporting Form. Appendix E contains applicable GEI Health and Safety (H&S) Standard Operating Procedures (SOPs) for the Site.

2.1 Scope of Field Work

The scope of field work covered under this CHASP includes the post-remedial actions to be implemented in accordance with the SMP and all concurrent redevelopment activities, which consist of the following:

1. Implementation of a Community Air Monitoring Program (CAMP) for particulates and volatile organic compounds (VOCs) during monitoring well installation and any excavation at the Site.
2. Limited excavation in landscaping areas to accommodate tree and shrub plantings.

3. Screening for indications of contamination (by visual means, odor, and monitoring with photoionization detector [PID]) of all excavated soil during any intrusive Site work.
4. Appropriate off-Site disposal of all material removed from the Site in accordance with all federal, state, and local rules and regulations for handling, transport, and disposal. Waste disposal facilities will be selected based on the data that has been collected to date and Waste Classification soil sampling. Based on the requirements of the selected facilities, additional soil waste characterization samples may be collected and analyzed as needed to obtain approval for soil disposal.
5. In landscaped areas of the Site, clean fill meeting the requirements of 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.7(d) will be brought in to replace the excavated soil and establish at least 2-feet of clean soil beneath the designed grades at the Site. On-Site soil which does not exceed the above-noted excavation criteria (RRUSCOs) or the protection of groundwater SCOs for any constituent may be used elsewhere on-Site, including below the water table to regrade the Site.
6. All responsibilities associated with the Site Management, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable federal, state, and local rules and regulations.
7. Submission of Groundwater Sample Results, Soil Vapor Intrusion Evaluation Results, and Periodic Review Reports (PRRs) that describe post-remedial activities, certifies remedial requirements are still being met, and lists any deviations from the SMP, if applicable.

2.2 Site Description

The Site is located at 375 West 207th Street within the Inwood section of the Borough of Manhattan, City of New York, and State of New York. The Site is 71,575 square feet in size encompassing an entire city block (Block 2188, Lot 1) for a total area encompassing 1.64 acres. The Site is bounded by 9th Avenue to the west, West 208th Street to the north, the Harlem River to the east, and West 207th Street/University Heights Bridge approach to the south.

Currently, the entire Site is an active redevelopment site encircled by construction fence. Following completion of the new residential construction, the Site building will encompass the majority of the Site. The northern and western walls of the building are situated on the respective northern and western Site boundaries, with concrete covered sidewalks beyond. Concrete covered sidewalks with street tree plantings will be constructed on the southern side of the building to the Site boundary, followed by an asphalt covered emergency accessway

beyond. Concrete covered sidewalks, a permeable paver walkway, and landscaped areas will be constructed to the east of the building.

3. Statement of Safety and Health Policy

GEI is committed to providing a safe and healthy work environment for its employees. To maintain a safe work environment, GEI has established an organizational structure and a Corporate Health and Safety Program to promote the following objectives:

- Reduce the risk of injury, illness, and loss of life to GEI employees.
- Maintain compliance with federal, state, and other applicable safety regulations; and minimize GEI employees' work exposure to potential physical, chemical, biological, and radiological hazards.

Safety policy and procedure on any one project cannot be administered, implemented, monitored, and enforced by any one individual. The total objective of a safe, accident-free work environment can only be accomplished by a dedicated, concerted effort by every individual involved with the project from management down to all employees.

Each GEI employee must understand their value to the company; the costs of accidents, both monetary, physical, and emotional; the objective of the safety policy and procedures; the safety rules that apply to the safety policy and procedures; and what their individual role is in administering, implementing, monitoring, and compliance of their safety policy and procedures. This allows for a more personal approach to compliance through planning, training, understanding, and cooperative effort, rather than by strict enforcement. If for any reason an unsafe act persists, strict enforcement will be implemented.

4. Hazard/Risk Analysis

The potential hazards associated with site conditions and activity hazards related to GEI on-site activities have been identified in this section.

4.1 Special Site Conditions or Concerns

Traffic: The majority of traffic on the project site prior to building completion will be construction traffic. Following construction completion, there will be minimal on-site traffic. Potential traffic hazards will consist of off-site adjoining NYC roadways.

Drill Rig/Equipment: Drilling contractor will use track-mounted rotary drill rigs. Specific attention given to rotating equipment, pinch points, and overhead equipment.

Safety Equipment will include: first aid kit, fire extinguisher, eye wash bottles, adequate supply of drinking water and electrolyte fluids, hand cleaner, insect repellent, sunscreen, and cell phone.

4.2 Activity Hazard Analysis

The potential hazards for this project associated with site conditions and activity hazards associated with GEI on-site activities have been identified in Table 2. General hazards and control measures that are applicable to all site activities are identified in the General Hazards section. The site-specific tasks, potential hazards, and control measures established to reduce the risk of injury or illness are identified in the Activity Hazard section of Table 2. Health and Safety SOPs for routine hazards and common site conditions are referenced in the table below and included in Appendix E.

Table 2. Activity Hazard Analysis

General Hazards These Hazards Apply to All Site Activities	Control Measure
Chemical/Contaminant Exposure Skin and eye injury/irritation	• Wear protective coveralls (e.g., Tyvek ®) with shoe covers, safety glasses, face shield, Nitrile gloves. • Dispose of gloves after use and wash hands. • Avoid contact with pooled liquids and limit contact with contaminated soils/groundwater. • See SOP HS-009

General Hazards These Hazards Apply to All Site Activities	Control Measure
Driving	• Employees must wear their safety belt while in a moving vehicle. • Vehicle accidents will be reported in accordance with GEI's accident reporting procedures. • Vehicles will be properly maintained and safely operated (refer to GEI's Fleet Maintenance Program). • Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction. Employees should not exceed the posted speed limit and should maintain a safe distance between other vehicles. • Use defensive driving techniques. • Driving distance and time after a 12-hour shift should not exceed 30 miles or 30 minutes (whichever is greater). • See SOP HS-004
Dusty Conditions Eye and respiratory irritation	• Avoid travel at extreme times. • Wear protective gear – dust masks, safety glasses
Heat stress Fainting, Fatigue, Heat Stroke	• Increase water intake while working. • Increase number of rest breaks and/or rotate workers in shorter work shifts. Rest in cool, dry areas. • Watch for signs and symptoms of heat exhaustion and fatigue. • Plan work for early morning or evening during hot months. • Use ice vests when necessary. • In the event of heat stroke, bring the victim to a cool environment and initiate first aid procedures. • See Appendix C of the HASP
Cold Stress Hypothermia, Frostbite	• Take breaks in heated shelters when working in extremely cold temperatures. • Drink warm liquids to reduce the susceptibility to cold stress.

General Hazards These Hazards Apply to All Site Activities	Control Measure
	• Wear protective clothing (recommended three layers: an outside layer to break the wind, a middle layer to provide insulation, and an inner layer of cotton or synthetic weave to allow ventilation). • Wear a hat and insulated boots. • Keep a change of dry clothing available in case clothes become wet. • Do heavy work during the warmer parts of the day and take breaks from the cold. • If possible, shield work areas from drafts of wind and use insulating material on equipment handles when temperatures are below 30°F. • Watch for symptoms of cold stress. See Appendix C in HASP
Inclement Weather	• Listen to local forecasts for warnings about specific weather hazards such as tornados, thunderstorms, and flash floods. • If the storms produce thunder and/or lightning, leave the work area immediately and move to a safe area. • Discuss an action plan prior to the severe weather. • Wear appropriate PPE for the type of weather that could be encountered. • Stop work until conditions are suitable. Take cover in vehicles or shelter as appropriate. • See SOP HS-010
Insects Bites, Stings, Allergic Reactions	• Apply insect repellent prior to performing field work and as often as needed throughout the work shift. • Wear proper protective clothing (work boots, socks and light-colored clothing) • Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk). • When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.

General Hazards These Hazards Apply to All Site Activities	Control Measure
	• Field personnel who may have insect allergies should have bee sting allergy medication on site and should provide this information to the SSO and the CHSO prior to commencing work. • Field personnel should perform a self-check at the end of the day for ticks. • See SOP HS-001
Physical Injury Slips, Trips and Falls	• Wear PPE that properly fits, is in good condition and appropriate for the activities and hazards. • Maintain good visibility of the work area. • Avoid walking on uneven, steeply sloped or debris ridden ground surfaces. • Plan tasks prior to preforming them including an activity hazard analysis. • Keep trafficked areas free from slip/trip/fall hazards. • Maintain weed growth in sampling areas, especially on slopes. • Wear shoes with traction. • Avoid traversing steep areas in slippery conditions. • Do not carry heavy objects to sampling areas, on steeply sloped areas, or where steep areas must be traversed to arrive at sample points.
Poisonous Plants Poison Ivy, Poison Oak, and Poison Sumac	• Avoid areas infested with poisonous plants. • Use a barrier cream to provide some protection. • Wash exposed clothing separately in hot water with detergent. • After use, clean tools, and soles of boots with rubbing alcohol or soap and lots of water. • Immediately wash with soap and water any areas that come into contact with poisonous plants. • If exposed to a poisonous plant, wash with soap and water or a product such as TechnuTM. First aid kits are available in the company vehicles. • See SOP HS-001
Utilities Shock, Electrocution, Fire, Explosion	• A thorough underground utility survey must be conducted prior to intrusive

General Hazards These Hazards Apply to All Site Activities	Control Measure
	activities. Coordination with utility locating services, property owner(s) or utility companies must be conducted. • Utilities are to be considered live or active until documented otherwise. • For overhead utilities within 50 feet, determine with the utility company the appropriate distance. Minimum distance for clearance is based on voltage of the line. • If exposing a utility, proper support and protection must be provided so that the utility will not be damaged. • If a gas line is contacted, the contractor must notify police, fire, and emergency personnel, and evacuate employees according to the site evacuation procedures. No attempt should be made to tamper with or correct the damaged utility. • See SOP HS-014
Vehicular Traffic Struck by injury, crushing	• Increase visibility of the work area to others by using cones, flags, barricades, proper lighting, and caution tape to define work area. • Use a "spotter" to locate oncoming vehicles. • Use vehicle to block work area. • Engage police detail for all work conducted in appropriate areas. • Wear high-visibility, reflective vest at all times. • Maintain minimum United States Department of Transportation (DOT) defined distances to other traffic lanes. • See SOP HS-016

Activity	Potential Hazard	Control Measures
Carrying Equipment	Heavy lifting, strains/sprains, slips/trips/falls, pinch points	• Use proper lifting techniques as defined in the heavy lifting activity analysis below. • Wear the proper type of glove to protect hands against sharp edges and skin/soft tissue injuries.

Activity	Potential Hazard	Control Measures
		• Wear appropriate footwear. • Be aware of hard to grip and hold items that may force your hand or wrist into awkward, stressful positions and cause disorders like tendinitis or carpal tunnel syndrome. • Take breaks when carrying items frequently and/or for long distances. • Do not overreach when picking up or placing items. • Use the buddy system when necessary. • When climbing ladders, maintain three points of contact at all times. DO NOT carry equipment up or down ladders unless it is in a secure backpack or similar hands-free shoulder-strap bag or case. Lower or raise larger equipment by crane or rope.
Construction Equipment	Struck-by, caught-in between equipment, crushing, pinch points	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or (electrical hazard) EH-rated safety boots with composite toe and shank; safety glasses; nitrile/neoprene gloves; and earplugs. • Identify yourself and your work location to heavy equipment operators, so they may incorporate you into their operations. • Coordinate hand signals with operators. • Stay Alert! Pay attention to equipment backup alarms and swing radii.

Activity	Potential Hazard	Control Measures
		• Wear a high-visibility, reflective vest when working near equipment or motor vehicle traffic. • Position yourself in a safe location when filling out logs talking with the contractor. • Notify the contractor immediately if any problems arise. • Do not stand or sit under suspended loads or near any pressurized equipment lines. • Do not operate cellular telephones in the vicinity of heavy equipment operation. • See HS-018
Drum Handling	Contaminant Contact, Cuts or Abrasions, Heavy Lifting, Slips/Trips/Falls	• Wear proper PPE during sampling including nitrile gloves and safety glasses and face shield as appropriate. • Use proper dollies or drum moving tools. • Use applicable tools to open/close drum lids. • Do not handle drums with bulging sides. • Dispose of gloves after use and wash hands. • Wear work gloves over nitrile gloves. • Use proper lifting techniques. • Ask fellow worker for help. • Keep trafficked areas free from slip/trip/fall hazards. • See SOP HS-003
Excavation and Trenching Oversight	Crushing, entrapment, falls, fire/explosion	• Prior to excavating, determine utility locations and have locations marked by utility

Activity	Potential Hazard	Control Measures
		companies and the property owner. • Utilities shall be properly supported, and barriers should be erected around excavations in remote areas. • Backfill temporary excavations when work is completed. • Personnel must remain 2 feet from the face of the excavation. • Sides, slopes, and faces shall meet Occupational Safety and Health Administration (OSHA) requirements. • Excavation entry will be allowed only with proper sloping or shoring. • See SOP HS-006
Heavy Lifting	Back injury, knee injury	• Use proper lifting techniques. • Ask fellow worker for help. • Use a mechanical lifting device or a lifting aid where appropriate. • If you must lift, plan the lift before doing it. • Check your route for clearance. • Bend at the knees and use leg muscles when lifting. • Use the buddy system when lifting heavy or awkward objects. • Do not twist your body while lifting. See SOP HS-025
Heavy Equipment / Drill Rig Working Near	Struck-by, caught-in- between equipment, crushing, pinch points	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or (electrical hazard) EH-rated safety boots with composite toe and

Activity	Potential Hazard	Control Measures
		shank; safety glasses; nitrile/neoprene gloves; and earplugs. • Identify yourself and your work location to heavy equipment operators, so they may incorporate you into their operations. • Coordinate hand signals with operators. • Stay Alert! Pay attention to equipment backup alarms and swing radii. • Wear a high-visibility, reflective vest when working near equipment or motor vehicle traffic. • Position yourself in a safe location when filling out logs talking with the contractor. • Notify the contractor immediately if any problems arise. • Do not stand or sit under suspended loads or near any pressurized equipment lines. • Do not operate cellular telephones in the vicinity of heavy equipment operation. • See SOP HS-018
Groundwater Sampling/Soil Vapor Sampling	Contaminant Exposure, Cuts/Scrapes, Heavy Lifting, Repetition, Slips/Trips/Falls	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or composite toe and shank; safety glasses; Nitrile/neoprene gloves; and earplugs as necessary. • Dispose of gloves after use and wash hands. • Wear work gloves over nitrile gloves. • Excavation entry will be allowed only with proper sloping or shoring.

Activity	Potential Hazard	Control Measures
		• Take regular breaks and do not work in unusual positions for long periods of time. • Keep trafficked areas free from slip/trip/fall hazards.

PPE is the initial level of protection based on the activity hazards and Site conditions which have been identified. Upgrades to respiratory protection may be required based on the designated Action Levels found in Section 9. General on-Site provisions will include extra nitrile, leather, and/or Kevlar gloves, extra protective coveralls (e.g. Tyvek®) with boot covers, drinking water and electrolyte fluids, reflective vest, first aid kit, fire extinguisher, hearing protection, and washing facilities.

If Site conditions suggest the existence of a situation more hazardous than anticipated, the Site personnel will evacuate the immediate area. The hazard, the level of precautions, and the PPE will then be reevaluated with the assistance and approval of the Corporate Health and Safety Officer (CHSO) and the PM.

4.3 Personal Safety

Field activities have the potential to take employees into areas which may pose a risk to personal safety. The following websites (sources) have been researched to identify potential crime activity in the area of the project:

- www.crimereports.com: Departments in this area are not currently sharing data through CrimeReports.
- www.cityrating.com/crimestatistics.asp: Crime in New York City is higher than the New York State and national averages.
- www.crimemapping.com: No data provided for the past 30 days within a mile of the Site.

To protect yourself, take the following precautions:

- If deemed necessary by the PM, use the buddy system (teams of a minimum of two persons present).
- Let the Site Safety Officer (SSO) know when you begin work in these areas and when you leave.
- Call in regularly.

- Pay attention to what is going on around you.
- If you arrive in an area and it does not look safe to get out of your vehicle, lock the doors and drive off quickly but safely.

Employees must not knowingly enter into a situation where there is the potential for physical and violent behaviors to occur. If employees encounter hostile individuals or a confrontation develops in the work area, suspend work activities, immediately leave the area of concern, and contact local 911 for assistance. Notify the SSO and Safety Team (Corporate Health and Safety Officer and Regional Health and Safety Officers – SafetyTeam@geiconsultants.com) of any incidents once you are out of potential danger.

In the event of an emergency, prompt communications with local emergency responders is essential. At least one charged and otherwise functioning cell phone to facilitate emergency communications will be on-site. Confirmation of cellular phone operation will be confirmed at the start of each working day.

4.3.1 Handling Drums and Containers

Regulations for handling drums and containers are specified by OSHA 29 Code of Federal Regulations (CFR) 1910.120(j). Potential hazards associated with handling drums include vapor generation, fire, explosions, and possible physical injury. Handling of drums/containers during the Site investigation and remediation activities may be necessary. If drum/container handling is necessary, it will be performed in accordance with applicable regulations.

4.3.1.1 Utilities

The Site may have shallow, buried utilities and also overhead utilities in certain areas. It will be necessary for parties disturbing the existing ground surface and conducting operations with heavy equipment having high clearances to exercise caution in performing project- related work with respect to the presence of utilities. Utility companies with active, buried lines in the Site area will be asked by the Contractor performing intrusive activities to mark their facilities. Employees will use these data to choose work locations.

4.3.1.2 Underground Utilities

No excavating, drilling, boring, or other intrusive activities will be performed until an underground utility survey, conducted by knowledgeable persons or agencies, has been made. This survey will identify underground and in-workplace utilities such as the following:

- Electrical lines and appliances.

- Telephone lines.
- Cable television lines.
- Gas lines.
- Pipelines.
- Steam lines.
- Water lines.
- Sewer lines.
- Pressurized air lines.

The location of utilities will be discussed with GEI employees and subcontractors during a Site Safety Briefing. Identified utilities should be marked or access otherwise restricted to avoid chance of accidental contact.

Even when a utility search has been completed, drilling, boring, and excavation should commence with caution until advanced beyond the depth at which such utilities are usually located. Utilities will be considered "live" or active until reliable sources demonstrate otherwise.

4.3.1.3 Heat Stress

Employees may be exposed to the hazards associated with heat stress when ambient temperatures exceed 70ºF. Employees should increase water intake while working in conditions of high heat. Enough water should be available so that each employee can consume 1 quart of water per hour. In addition, they should increase number of rest breaks and/or rotate employees in shorter work shifts. Employees should rest in cool, dry, shaded areas for at least 5 minutes. Employees should not wait until they feel sick to cool down. Watch for signs and symptoms of heat exhaustion and fatigue. In the event of heat stroke, bring the victim to a cool environment, call for help, and initiate first aid procedures.

The procedures to be followed regarding avoiding heat stress are provided in Appendix C – Heat Stress Guidelines and in GEI's Heat Stress program.

4.3.2 Cold Stress

Employees may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia, as well as slippery surfaces, brittle equipment, and poor judgment. The procedures to be followed regarding avoiding cold stress are provided in Appendix C – Cold Stress Guidelines and in GEI's Cold Stress program.

4.3.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, and generators. Employees who will perform suspected or established high noise tasks and operations will wear hearing protection. If deemed necessary by the SSO, the CHSO will be consulted on the need for additional hearing protection and the need to monitor sound levels for Site activities. Other employees who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise.

4.3.4 Hand and Power Tools

In order to complete the various tasks for the project, personnel may use 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. Work gloves, safety glasses, and hard hats will be worn by the operating personnel when using hand and power tools and Ground Fault Circuit Interrupter (GFCI)- equipped circuits will be used for power tools.

4.3.5 Manual Lifting

Manual lifting of objects and equipment may be required. Failure to follow proper lifting technique can result in back injuries and strains. Employees should use a buddy system and/or power equipment to lift heavy loads whenever possible and should evaluate loads before trying to lift them (i.e., they should be able to easily tip the load and then return it to its original position). Carrying heavy loads with a buddy and proper lifting techniques include: 1) make sure footing is solid; 2) make back straight with no curving or slouching; 3) center body over feet; 4) grasp the object firmly and as close to your body as possible; 5) lift with legs; and 6) turn with your feet, do not twist.

4.3.6 Cuts and Lacerations

The core sampling program may require employees to use powered cutting tools (circular saw or shears) or a hooked knife to cut open the sample liner. Safety box cutters will be utilized for routine operations such as opening boxes of supplies or cutting rope or string. When using cutting tools, follow the safety precautions listed below:

- Keep free hand out of the way.
- Secure work if cutting through thick material.
- Use only sharp blades; dull blades require more force that results in less knife control.

- Pull the knife through the object and away from your body; pulling motions are easier to manage.
- Do not put the knife in your pocket.
- Wear leather or Kevlar® gloves when using knives or blades, or when removing sharp objects caught or dangling in sampling gear.

4.4 Chemical Hazards

The characteristics of compounds at the Site are discussed below for information purposes. Adherence to the safety and health guidelines in this CHASP should reduce the potential for exposure to the compounds discussed below.

Heavy Metals

Exposure to high concentrations of arsenic can cause dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, and hyper pigmentation of skin. Chronic exposure to arsenic has resulted in lung cancer in humans.

Exposure to high concentrations of aluminum can cause irritation of the eyes, skin, and the respiratory system.

Exposure to high concentrations of antimony can cause irritation of eyes, skin, nose, throat, and mouth; coughing; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; and could be unable to smell properly. Chronic exposure to antimony can produce respiratory effects that include antimony pneumoconiosis (inflammation of the lungs due to irritation caused by the inhalation of dust), alterations in pulmonary function, chronic bronchitis, chronic emphysema, inactive tuberculosis, pleural adhesions, irritation; cardiovascular effects (increased blood pressure, altered EKG readings and heart muscle damage) and gastrointestinal disorders in humans.

Exposure to high concentrations of beryllium can result in “beryllium sensitization” which is an allergic response to beryllium. Symptoms of the disease include cough, shortness of breath, fatigue, fevers, skin rash, and night sweats. In the later stages, lung tissue becomes scarred. In severe cases, the right side of the heart may be strained due to increased pressure in the pulmonary artery from lung damage.

Exposure to high concentrations of cadmium can cause acute symptoms such as pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness and pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; loss of the sense of smell), mild anemia; and is considered a potential occupational carcinogen.

Exposure to chromium can cause acute symptoms such as irritation of the eyes, nose and throat as well as wheezing and coughing. Chronic effects include nosebleeds, nasal congestion, dermatitis, and loss of sight.

Exposure to high concentrations of copper through inhalation can cause irritation of the eyes, nose, pharynx, nasal septum. Ingestion may cause a metallic taste. Skin irritation may result from direct contact with skin. Damage to the liver and kidneys may occur.

No adverse health effects are associated with environmental exposure to iron. Target organs for iron via ingestion of iron (most often in supplement form) are the liver, cardiovascular system, and kidneys. Exposure to high concentrations of iron through ingestion can cause salivation nausea, vomiting, diarrhea, and abdominal pain.

Exposure to lead may cause acute symptoms such as eye irritation, weakness, weight loss, abdominal pain, and anemia. Chronic exposure to lead may result in kidney disease, effects to the reproductive system, blood forming organs, and Central Nervous System (CNS).

Lead and arsenic are regulated by specific OSHA standards. They are 29 CFR 1910.1025/1926.52 and 29 CFR 1910.1018/1926.1118, respectively. These standards include specific requirements for air monitoring, signs and labels, training and medical surveillance.

Exposure to high concentrations of manganese can cause manganism, metal fume fever, flu- like fever, and kidney damage.

Exposure to high concentrations of nickel may cause sensitization dermatitis, allergic asthma, and pneumonitis. Exposure to mercury can cause dizziness, salivation nausea, vomiting, diarrhea, constipation, emotional disturbance, and kidney injury. Chronic exposure to mercury can cause CNS damage.

Exposure to high concentrations of selenium can cause mucous membrane irritation, coughing, sneezing, shortness of breath, chills, headaches, hypotension, and CNS depression. Chronic exposure to selenium could cause bronchial irritation, gastrointestinal distress, excessive fatigue, and skin discoloration.

Exposure to high concentrations of thallium can cause nausea, diarrhea, abdominal pain, vomiting; tremor; chest pain, pulmonary edema; convulsions, psychosis; liver, kidney damage; and alopecia.

Vanadium may cause greenish-black discoloration of the tongue and is possibly carcinogenic to humans. Long-term or repeated exposure to vanadium may have effects on the respiratory tract, resulting in chronic rhinitis and chronic bronchitis.

Exposure to high concentrations of zinc through ingestion can cause abdominal pain, nausea, vomiting, and diarrhea. Chronic exposure can lead to low blood pressure, jaundice, and seizures.

These metals are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. As with semi-volatile organic compounds (SVOCs), the primary route of exposure is through inhalation of dust particles when soil is disturbed and becomes airborne.

Pesticides

Pesticide exposures, in general, affect the CNS, liver, kidneys, and skin. At high concentrations, pesticides can cause headache, dizziness, nausea, vomiting, malaise (vague feeling of discomfort), sweating, limb jerks, convulsions, and coma. The pesticides detected at the Site are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of chemicals consisting of numerous carbon atoms joined together to form multiple rings. Most are formed from the incomplete combustion of plant or animal matter, or carbon fuels, such as coal or petroleum. These compounds are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. PAHs may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling, and redness. Direct contact or exposure to the vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. High levels of exposure to PAHs, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney, and skin cancer. Naphthalene is also an eye and skin irritant and can cause nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. Poisoning may occur by ingestion of large doses, inhalation, or skin absorption.

The major route of entry for the work activities to be conducted at this Site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

Polychlorinated Biphenyls (PCBs)

PCBs have historically been used from a number of sources including, but not limited to; electrical systems, hydraulic oils, lubricants, cutting oils, printer's ink, and asphalt. Exposure to PCBs can occur through unbroken skin without immediate pain or irritation. PCBs detected at the site are at environmental concentrations and are not expected to be at

concentrations that exposure symptoms would occur. Acute effects of exposure to high concentrations of PCB can include eye, skin, nose, and throat irritation. Chronic effects of PCB exposure can include skin swelling and redness, gastro-intestinal disturbances, and neurological effects such as headache, dizziness, nervousness, and numbness of extremities. PCBs are suspected human carcinogens that can cause liver cancer. PCBs can accumulate in fatty tissues and result in health effects after the initial exposure has occurred. The primary route of exposure for PCBs is inhalation, dermal contact, and ingestion. Analysis of soils from the Site did not indicate elevated PCB concentrations.

Semivolatile Organic Compounds

SVOCs usually consist of a mixture of acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluorethene, benz(a)pyrene, benzo(e)pyrene, benzo(g,h,i)peryline, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3cd)pyrene, 2-methyl naphthalene, naphththalene, phenanthrene, phenols, and pyrene.

These SVOCs are present at the Site within impacted soil and groundwater. These compounds are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. SVOCs such as those listed above may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling, and redness. Direct contact or exposure to the vapors may be irritating to the eyes.

Conjunctivitis may result from prolonged exposure. Many SVOCs are considered to be very toxic, if ingested. High levels of exposure to SVOCs, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney, and skin cancer. Naphthalene is also an eye and skin irritant and can cause nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. Poisoning may occur by ingestion of large doses, inhalation, or skin absorption.

The major route of entry for the work activities to be conducted at this Site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

Volatile Organic Compounds

Petroleum Hydrocarbons

VOCs, such as benzene, toluene, ethyl benzene, and xylene (BTEX) are present as soil and groundwater contaminants. These compounds are detected at the Site at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. These compounds generally have a depressant effect on the CNS, may cause chronic

liver and kidney damage, and some are suspected human carcinogens. Benzene is a known human carcinogen. Acute exposure may include headache, dizziness, nausea, and skin and eye irritation. The primary route of exposure to VOCs is through inhalation and therefore respiratory protection is the primary control against exposure to VOCs.

Chlorinated Hydrocarbons

Chlorinated hydrocarbons (organochlorides) are a very large and diverse group of hydrocarbon molecules that also have at least one covalently bound chlorine atom chemically bonded to them. Chlorinated hydrocarbons are used predominantly as solvents and have historically been used as industrial degreasers, dry cleaning solvents, anesthetic agents, and as refrigerants. They are colorless, volatile liquids with a moderately sweet aroma and partially soluble in, but denser than water. They are the most common DNAPL.

The more common forms of chlorinated solvent contamination of soils and groundwaters include:

- Tetrachloroethene (PCE, Tetrachloroethylene).
- Carbon tetrachloride (Tetrachloromethane or carbon tet).
- Trichloroethylene (TCE,Trichloroethene).
- 1,1,1-TrichloroMethane (Chloroform).
- 1,1,1-Trichloroethane (TCA, methyl chloroform, chlorothene, Solvent 111).
- Dichloromethane (DCM or methylene chloride).

As a class, the chlorinated hydrocarbons are potent CNS depressants or stimulants. They also cause greater liver and kidney damage compared to other organic solvents. Many have been shown to cause cancer in laboratory animals; due to widespread industrial use, the issue of carcinogenic risk to humans is one of the most controversial issues in regulatory toxicology. Exposure to chlorinated hydrocarbon compounds in the occupational setting is primarily through inhalation. Skin absorption is variable and usually insignificant, although dermal absorption following prolonged or extensive skin contact can cause systemic toxicity.

4.4.1 Evaluation of Organic Vapor Exposure

Air monitoring reduces the risk of overexposure by indicating when action levels have been exceeded and when PPE must be upgraded or changed. Action Levels for VOCs and associated contingency plans for the work zone are discussed within Section 9 of this CHASP.

Exposure to organic vapors will be evaluated and/or controlled by:

- Monitoring air concentrations for organic vapors in the breathing zone with a PID or a flame ionization detector (FID).
- When possible, engineering control measures will be utilized to suppress the volatile organic vapors. Engineering methods can include utilizing a fan to promote air circulation, utilizing volatile suppressant foam, providing artificial ground cover, or covering up the impacted material with a tarp to mitigate volatile odors.
- When volatile suppression engineering controls are not effective and organic vapor meters indicate concentrations above the action levels, then appropriate respiratory protection (i.e., air purifying respirator with organic vapor cartridge) will be employed.

4.4.2 Evaluation of Skin Contact and Absorption

Skin contact by contaminants may be controlled by use of proper hygiene practices, PPE, and good housekeeping procedures. The proper PPE (e.g., Tyvek®, gloves, safety glasses) as described in Section 5 will be worn for activities where contact with potential contaminated media or materials are expected.

SDSs for decontamination chemicals and laboratory reagents that may be used on-Site are included in Appendix B. Specific chemical hazards information from the occupational health sources are summarized in Table 3.

Table 3. Chemical Data

Compound	CAS #	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
Aluminum	7429-90-5	NIOSH REL: TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)	TWA 15 mg/m^3 (total) TWA 5 mg/m^3 (resp)	Inhalation, skin and/or eye contact	Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system	Silvery-white, malleable, ductile, odorless metal. FP: none LEL:N/A UEL: N/A VP: 0 mm
Antimony	7440-36-0	TWA 0.5 mg/m^3	TWA 0.5 mg/m^3	Inhalation, Ingestion, Skin Contact, Eyes	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Respiratory system, skin, eyes, cardiovascular systems	Silver-white, lustrous, hard, brittle solid; scale- like crystals; or a dark- gray, lustrous powder. FP: NA IP: NA LEL: NA UEL NA VP: 0 mm
Arsenic	7440-38-2	0.01 mg/ m^3	0.01 mg/m^3 A.L. .005 mg/m^3	Inhalation, Skin Absorption, Ingestion, Skin Contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen	Liver, kidneys, skin, lungs, lymphatic system	Metal: Silver-gray or tin- white, brittle, odorless solid FP: NA IP: NA LEL: NA UEL: NA VP: 0 mm
Barium	7727-43-7	TWA 10 mg/m^3 (total) TWA	TWA 15 mg/m^3 (total) TWA	Inhalation, skin and/or eye contact	Irritation eyes, nose, upper respiratorysystem; benign	Eyes, respiratory system	Metal: White or yellowish, odorless powder

		5 mg/m^3 (resp)	5 mg/m^3 (resp)		pneumoconiosis (baritosis)		FP: NA IP: NA LEL: NA UEL: NA VP: 0 mm
Benzene	71-43-2	0.5 ppm (Skin)	1 ppm TWA 5 ppm STEL	Inhalation Skin Absorption Ingestion Skin Contact	Irritation of eyes, skin, nose, respiratory system, giddiness, headache, nausea; staggering gait, fatigue, anorexia, weakness, dermatitis, bone marrow depression, potential carcinogen	Eyes, skin, CNS, bone marrow, blood	FP: 12^{O} F IP: 9.24 eve LEL: 1.2% UEL:7.8% VP: 75 mm
Beryllium	7440-41-7	NIOSH REL: Ca C 0.0005 m g/m^3	TWA 0.002 mg/m ^{3} C 0.005 mg/m ^{3} (30 minutes) with a maximum peak of 0.025 mg/m ^{3}	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 eyes; dermatitis; [potential occupational carcinogen]	Eyes, skin, respiratory system	A hard, brittle, gray-white solid. FP: none LEL:N/A UEL: N/A VP: 0 mm
Cadmium	7440-43-9 (metal)	CA	TWA 0.005 mg/m ^{3}	Inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal	Respiratory system, kidneys, prostate,	Silver-white, blue-tinged lustrous, odorless solid. FP: NA IP: NA LEL: NA UEL: NA

					(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]	blood; **Cancer Site** [prostatic & lung cancer]	VP: 0 mm
Carbon Tetrachloride	56-23-5	Ca ST 2 ppm (12.6 mg/ m^3) [60-minute]	Ca ST 2 ppm (12.6 mg/m^3) [60-minute]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]	CNS, eyes, lungs, liver, kidneys, skin	Colorless liquid with a characteristic ether-like odor FP: NA IP: 11.47 eV LEL: NA UEL: NA VP: 91 mmHg
Ethylbenzene	100-41-4	100 ppm	100 ppm	Inhalation Ingestion Skin Contact	Eye, skin, mucous membrane irritation; headache; dermatitis, narcosis; coma	Eyes, skin, respiratory system, CNS	FP: 55^o F IP: 8.76 eV LEL: 0.8% UEL:6.7% VP: 7 mm
Iron	1309-37-1	Iron oxide dust and fume (Fe2O3) as Fe: 5 mg/m^3 (TWA);	Iron oxide dust and fume: 10 mg/m^3	Inhalation, ingestion, eye contact	Respiratory tract irritation, coughing, shortness of breath, overdose of iron may cause vomiting, abdominal pain,	Eyes, respiratory system, GI tract, liver	Reddish brown solid FP: NA LEL: NA UEL: NA VP: 0 mmHg

					bloody diarrhea, vomiting blood, lethargy, and shock; acidity in the blood, bluish skin discoloration, fever, liver damage, and possibly death; eye and cornea irritation and discoloration		
Lead	7439-92-1	0.050 mg/ m^3	0.05 mg/m^3 A.L. 0.03 mg/m^3	Inhalation Ingestion Skin Contact	Weakness, insomnia; facial pallor; pal eye, anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis of wrist and ankles; irritates eyes, hypo tension	Eyes, GI tract, CNS, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. FP: NA IP: NA LEL: NA UEL: NA VP: 0 mm
Manganese	7439-96-5	TWA 1 mg/m^3 ST 3 mg/m^3	C 5 mg/m^3	Inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of	Respiratory system, CNS, blood, kidneys	A lustrous, brittle, silvery solid. FP: NA LEL: NA UEL: Na VP: 0 mmHg

					discomfort); lassitude (weakness, exhaustion); kidney damage		
Mercury	7439-97-6	0.025 mg/ m^3	0.10 mg/m^3	Inhalation Ingestion Skin Contact Skin Absorption	Irritates eyes and skin, chest pain, cough, difficulty breathing, bronchitis, pneumonitis, tremor, insomnia, irritability, indecision, headache, fatigue, weakness, stomatitis, salivation, Gastrointestinal disturbance, weight loss, proteinuria	Eyes, skin, respiratory tract, CNS	Silver-white, heavy odorless liquid FP: NA IP:? LEL: NA UEL:NA VP: 0.0012 mm
PCBs	11097-69-1	0.5 mg/m^3 (Skin)	0.5 mg/m^3 (Skin)	Inhalation Skin Absorption Ingestion Skin Contact	Irritate eyes; chloracne; liver damage;	Skin, eyes, liver, reproductive system	Colorless liquid or solid with a mild, hydro-carbon odor VP = 0.00006 mm
PCE	127-18-4	25 ppm	100 ppm TWA 200 ppm C 300 ppm (5 minutes in any 3 hours)	Inhalation, Ingestion, Skin Contact	Irritation, nausea, vomiting, chest pain, difficulty breathing, headache, drowsiness, dizziness, disorientation, loss of coordination, blurred vision, loss	Eyes, skin, respiratory system, liver, CNS	A colorless, sweet smelling volatile liquid. FP: NA IP: 9.32 eV LEL: NA UEL: NA VP: 14 mmHg

					of appetite, stomach pain, pain in extremities		
TCA	71-55-6	NA	350 TWA	Inhalation Ingestion Skin Contact	Irritation of eyes, nausea, vomiting, dizziness, drowsiness, blurred vision, headache	Respiratory system, CNS, liver, mucous membranes	Colorless liquid FP: NA? IP: 11 eV LEL: 7.5% UEL: 12.5% VP: 100 mmHg
TCE	79-01-6	200 ppm	100 ppm TWA 200 ppm C 300 ppm (5 minutes in any 3 hours)	Inhalation, Ingestion, Skin Contact	Irritation to eyes, skin, dizziness, fatigue, blurred vision, tremors, nausea, vomiting, drowsiness, headache	Kidneys, CNS, liver, heart, upper respiratory	Colorless liquid with chloroform odor FP: NA IP: 9.45 eV LEL: 8% UEL: 10.5% VP: 58 mmHg
Toluene	108-88-3	50 ppm	200 ppm	Inhalation Skin Absorption Ingestion Skin Contact	Eye, nose irritation; fatigue, weakness, confusion, euphoria, dizziness, headache; dilated pupils, tearing of eyes; nervousness, muscle fatigue, insomnia, tingling in limbs; dermatitis	Eyes, skin, respiratory system, CNS, liver, kidneys	FP: 40o F IP: 8.82 eV LEL: 1.1% UEL:7.1% VP: 21 mm
1,1,1 Trichloroethan e	71-55-6	C 350 ppm (1900 mg/ m^3) [15-minute]	350 TWA (1900 mg/ m^3)	Inhalation Ingestion Skin Contact	Irritation of eyes, nausea, vomiting, dizziness, drowsiness, blurred vision, headache	Respiratory system, CNS, liver, mucous membranes	Colorless liquid FP: NA? IP: 11 eV LEL: 7.5% UEL: 12.5% VP: 100 mmHg
1,2,4- Trimethyl- benzen e	95-63-6	NIOSH REL TWA 25 ppm	None	Inhalation, ingestion, skin and/or eye contact	irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic	Eyes, skin, respiratory system, CNS, blood	FP: 112°F BP: 337°F LEL: 0.9% UEL: 6.4% VP: 1 mmHg

					anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)		
1,3,5 – Trimethylbenzene	108-67-8	TWA 25 ppm (125 mg/ m^3)	NA	inhalation, ingestion, skin and/or eye contact	irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, CNS, blood	Class II Flammable Liquid FP: 122°F LEL: NA VP: 2mmHg IP: 8.39 eV UEL: NA
VOCs1	NA	0.5 ppm (Skin)	0.5 ppm TWA 2.5 ppm STEL	Inhalation, Skin Absorption, Ingestion, Skin Contact	Irritate eyes and skin; headaches; dizziness; nausea; kidney; liver damage; depress CNS	Skin, eyes, liver, kidney, CNS	Colorless volatile liquid, sometimes with a sweet or solvent odor

Xylene	1330-20-7	100 ppm	100 ppm	Inhalation Skin Absorption Ingestion, Skin Contact	Eye, skin, nose, throat irritation; dizziness, excitement, drowsiness; incoordination, staggering gait; corneal damage; appetite loss, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, CNS, GI tract, blood, liver, kidneys	FP: 90o F LEL: 0.9% UEL: 6.7% VP: 9 mm
Zinc	1314-13-2	5 mg/m^3 (TWA), 10 mg/m^3 (STEL) for zinc oxide fume	10 mg/m^3 (TWA), for zinc oxide fume	Inhalation	Metal fume fever: 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	Respiratory system	Colorless liquid FP: NA? IP: 11 eV LEL: 7.5% UEL: 12.5% VP: 100 mmHg

Abbreviations:

°F = degrees Fahrenheit
ACGIH = American Conference of Industrial Hygienists
A.L. = Action Level
atm = atmosphere
C = ceiling limit, not to be exceeded
CAS # = chemical abstract services number
CNS = Central Nervous System
CTPV = Coal Tar Pitch Volatiles
CVS = Cardiovascular System
eV = electron volt
f/cc = fibers per cubic centimeter
FP = Flash point
GI = Gastro-intestinal
H2S = Hydrogen Sulfide
HCN = Hydrogen Cyanide
hr = hour
IP = Ionization Potential
LEL = Lower explosive limit
mg/m^3 = micrograms per cubic meter
min = minute
mm = millimeter
mmHg = millimeters of mercury
N/A = not applicable
OSHA = Occupational Safety and Health Administration
PAH = Polycyclic Aromatic Hydrocarbons
PCB = Polychlorinated Biphenyls
PEL = Permissible exposure limit
ppm = parts per million
Skin = significant route of exposure
STEL = Short-term exposure limit (15 minutes)
TWA = Time-weighted average (8 hours)
VP = vapor pressure approximately 68°F in mm Hg

5. Personal Protective Equipment

The PPE specified in Table 4 represents PPE selection required by 29 CFR 1910.132 and is based on the Activity Hazard Analysis of Section 4 (Table 2). Specific information on the selection rationale activity can be found in the GEI Health and Safety Manual.

The PPE program addresses elements, such as PPE selection based on Site hazards, use and limitations, donning and doffing procedures, maintenance and storage, decontamination and disposal, training and proper fitting, inspection procedures prior to / during / and after use, evaluation of the effectiveness of the PPE program, and limitations during temperature extremes, heat stress, and other appropriate medical considerations. A summary of PPE for each level of protection is in Table 4.

Table 4. Site-Specific PPE

Task	PPE Level	Site-Specific Requirements	Respirator
Mobilization/Demobilization			
Reconnaissance	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None
Mobilization/Demobilization of Equipment and Supplies	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D – None
Establishment of Site Security, Work Zones, and Staging Area	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None
Construction			
Drilling, Groundwater Well Installation, Excavation, Digging Test Pits, Backfilling, Grading Observation, Sampling	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	Level D initially, Level C-If action levels exceeded (see Section 9 of CHASP)
Hazardous Materials Assessment			
Sampling Soil Vapor and Groundwater	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	D – None
Demolition/Remediation Observations			
Observe Contractor Activities	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as	D - None

		needed, nitrile gloves, hearing protection as needed, Tyvek as needed	

Use of Level A or Level B PPE is not anticipated. If conditions indicating the need for Level A or Level B PPE are encountered, personnel will leave the Site and this CHASP will be revised with oversight of the CHSO or GEI personnel will not re-enter the Site until conditions allow.

For most work conducted at the site, Level D PPE will include long pants, hard hats, safety glasses with side shields, and steel toe/shank or EH-rated safety boots. When work is conducted in areas where non-aqueous phase liquid (NAPL) or tar-saturated soil is anticipated, employees will wear, at a minimum, modified Level D PPE, which can include Tyvek® coveralls and safety boots with overboots.

5.1 OSHA Requirements for PPE

Personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Table 5. OSHA Standards for PPE

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1 1968
Respiratory	29 CFR 1910.134	ANSI Z88.1 1980
Head	29 CFR 1910.135	ANSI Z89.1 1969
Foot	29 CFR 1910.136	ANSI Z41.1 1999 or ASTM F-2412-2005, and ASTM F-2413-2005

CFR = Code of Federal Regulations
ANSI = American National Standards Institute
ASTM = American Society For Testing and Materials

On-Site GEI personnel who have the potential to don a respirator must have a valid fit test certification and documentation of medical clearance. The CHSO will maintain such information on file for on-site personnel. The PM will obtain such information from the subcontractor's site supervisor prior to the initiation of such work. Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.134). Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency (less than 20.7%).
- Imminent Danger to Life and Health (IDLH) concentrations.
- If contaminant levels exceed designated use concentrations.

6. Key Project Personnel/Responsibilities and Lines of Authority

6.1 GEI Personnel

Wendy Monterosso	Project Manager
Craig Hayes	Proposed Site Safety Officer/Field Personnel
Leif Robertson	Proposed Site Safety Officer/Field Personnel
Steve Hawkins	Corporate Health and Safety Officer
Jeena Sheppard	Regional Health and Safety Officer

The implementation of health and safety at this project location will be the shared responsibility of the PM, the CHSO, Regional Health and Safety Officer (RHSO), the SSO, other GEI personnel implementing the proposed scope of work.

6.1.1 GEI Project Manager

The PM, Wendy Monterosso, is responsible for confirming that the requirements of this CHASP are implemented. Some of the PM's specific responsibilities include:

- Conducting and documenting the Project Safety Briefing for GEI project employees and forwarding the signed form (Appendix D) to the Safety Team.
- Verifying that the GEI staff selected to work on this program are sufficiently trained for Site activities.
- Assuring those personnel to whom this CHASP applies, including subcontractor personnel, have received a copy of it.
- Providing the CHSO with updated information regarding conditions at the Site and the scope of Site work.
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of necessary safety procedures.
- Supporting the decisions made by the SSO and CHSO. Maintaining regular communications with the SSO and, if necessary, the CHSO.

- Verifying that the subcontractors selected by GEI to work on this program have completed GEI environmental, health and safety requirements and have been deemed acceptable for the proposed scope of work.
- Coordinating the activities of GEI subcontractors and confirming that they are aware of the pertinent health and safety requirements for this project.

6.1.2 GEI Corporate Health and Safety Officer

The CHSO is the individual responsible for the review, interpretation, and modification of this CHASP. Modifications to this CHASP which may result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the CHSO. Specific duties of the CHSO include:

- Writing, approving, and amending the CHASP for this project.
- Advising the PM and SSO on matters relating to health and safety on this Site.
- Recommending appropriate PPE and safety equipment to protect personnel from potential Site hazards.
- Conducting accident investigations.
- Maintaining regular contact with the PM and SSO to evaluate Site conditions and new information which might require modifications to the CHASP.

6.1.3 GEI Site Safety Officer

GEI field staff are responsible for implementing the safety requirements specified in this CHASP. However, one person will serve as the SSO. The SSO will be on-site during all activities covered by this CHASP. The SSO is responsible for enforcing the requirements of this CHASP once work begins. The SSO has the authority to immediately correct situations where noncompliance with this CHASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Conducting/attending the Project Safety Briefing prior to beginning work, and subsequent safety meetings as necessary.
- Conduct daily Safety Tailgate meeting briefing for Site-related work.
- Verifying that personnel to whom this CHASP applies have attended and participated in the Project Safety Briefing and subsequent safety meetings that are conducted during the implementation of the program.
- Maintaining a high level of health and safety consciousness among employees implementing the proposed activities.

- Procuring the air monitoring instrumentation required and performing air monitoring for investigative activities.
- Procuring and distributing the PPE and safety equipment needed for this project for GEI employees.
- Verifying that PPE and health and safety equipment used by GEI is in good working order.
- Verifying that the selected contractors are prepared with the correct PPE and safety equipment and supplies.
- Notifying the PM of noncompliance situations and stopping work in the event that an immediate danger situation is perceived.
- Monitoring and controlling the safety performance of personnel within the established restricted areas to confirm that required safety and health procedures are being followed.
- Stopping work in the event that an immediate danger situation is perceived.
- Reporting accident/incident and preparing accident/incident reports, if necessary.

6.1.4 GEI Field Personnel

GEI field personnel covered by this CHASP are responsible for following the health and safety procedures specified in this CHASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading and signing the CHASP in its entirety prior to the start of on-site work.
- Attending and actively participating in the required Project Safety Briefing prior to beginning on-Site work and any subsequent safety meetings that are conducted during the implementation of the program.
- Stopping work in the event that an immediate danger situation is perceived.
- Bringing forth any questions or concerns regarding the content of the CHASP to the PM or the SSO, prior to the start of work.
- Reporting accidents, injuries, and illnesses, regardless of their severity, to the SSO, CHSO, and HR.
- Complying with the requirements of this CHASP and the requests of the SSO.

6.1.5 Lines of Authority will be as follows

On Site: GEI will have responsibility for safety of its employees during the work performed at the Site. GEI's field representative will have a cell phone available to contact the appropriate local authorities, in the event of an emergency. GEI's field representative will be available for communication with the GEI PM and with the MADDD Equities representative.

GEI employees have the authority to stop work activities if an unanticipated hazard is encountered or a potential unsafe condition is observed. The GEI employee should contact the Corporate Health and Safety Officer and the Project Manager to discuss the stop work conditions and potential control methods that can be implemented.

6.2 Subcontractors

GEI has not yet selected subcontractors for the monitoring well installation work.

GEI requires its subcontractors to work in a responsible and safe manner. Subcontractors hired by GEI are required to submit documentation of their safety practices as part of GEI's Subcontractor Management Program for evaluation and approval before the start of work. Subcontractors for this project will be required to develop their own CHASP for protection of their employees, but, at a minimum, must adhere to applicable requirements set forth in this CHASP.

7. Training Program

7.1 HAZWOPER Training

In accordance with OSHA Standard 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response" (HAZWOPER) responders will, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. Personnel who have not met the requirements for initial training will not be allowed to work in any Site activities in which they may be exposed to hazards (chemical or physical). Proof of training will be submitted to the PM or his/her representative prior to the start of field activities.

7.2 Annual 8-Hour Refresher Training

Annual 8-hour refresher training will be required of hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 29 CFR 1910.120 requirements and related company programs and procedures. Proof of current 8-hour refresher training will be submitted to the PM or his/her representative prior to the start of field activities.

7.3 Supervisor Training

Personnel acting in a supervisory capacity will have received 8 hours of instruction in addition to the initial 40-hour training, as necessary. In addition, supervisors will have 1 year of field experience and training specific to work activities (i.e., sampling, construction observation, etc.).

7.4 Site-Specific Training

Prior to commencement of field activities, the PM or the SSO will verify GEI field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the Site operations. It will include Site and facility layout, hazards, and emergency services at the Site, and will highlight the provisions contained within this CHASP and applicable GEI H&S SOPs (Appendix E).

This training will be documented on the Project Safety Briefing Form (Appendix D). The signed form will be forwarded to the Safety Team at SafetyTeam@geiconsultants.com. In addition, GEI personnel will sign the plan to document that they understand the hazards and control measures presented and agree to comply with the procedures established in the CHASP. Personnel that have not received project-specific training will not be allowed on-Site.

7.5 On-Site Safety Briefings

Other GEI personnel will be given health and safety briefings daily by the SSO or field representative to assist GEI personnel in safely conducting work activities. The briefing will include GEI subcontractors. The briefings can include information on new operations to be conducted, changes in work practices, or changes in the Site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections.

Documentation of these briefings will be recorded in the GEI field book, if the project duration is less than 5 days. If the project is longer than 5 days, the Tailgate Safety Briefing Form (Appendix D) will be used to document briefings. The meetings will also be an opportunity to periodically update the employees on monitoring results.

7.6 First Aid and CPR

The PM will verify that GEI field staff has current certifications in first aid and Cardiopulmonary Resuscitation (CPR), so that emergency medical treatment is available during field activities, as necessary. The training will be consistent with the requirements of the American Red Cross Association. GEI employees also attend annual Bloodborne Pathogens training in compliance with OSHA regulations.

8. Medical Surveillance Program

GEI maintains a continuous, corporate, medical surveillance program that includes a plan designed specifically for field personnel engaged in work at sites where hazardous or toxic materials may be present. GEI's CHSO and is responsible for the administration and coordination of medical evaluations conducted for GEI's employees at branch office locations. Comprehensive examinations are given to GEI field personnel on an annual or biennial basis (as determined to be appropriate by the CHSO) participating in hazardous waste operations. The medical results of the examinations aid in determining the overall fitness of employees participating in field activities.

Under the CHSO's supervision, field personnel undergo a complete initial physical examination, including a detailed medical and occupational history before they participate in hazardous waste site investigations. Extensive annual/biennial reexaminations are also performed. Upon completion of these tests, personnel are certified by an occupational health physician as to whether they are fit for field work in general and fit to use respiratory protection.

If a GEI employee or other project worker shows symptoms of exposure to a hazardous substance and wishes to be rechecked, he/she will be directed to the nearest area hospital or medical facility.

GEI subcontractor personnel that will be performing any intrusive work at the Site or enter any active waste handling or other active non-"clean" area must certify that they are participating in a medical surveillance program that complies with OSHA regulations for hazardous waste operations (i.e., 29 CFR 1910.120 and 29 CFR 1926.65). Proof of medical clearance will be submitted to the GEI PM or SSO prior to the start of field activities.

9. Atmospheric Monitoring

Air monitoring will be performed consistent with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (Appendix F) to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of worker protection needed on-Site in the event that intrusive work is conducted. Work requiring air monitoring includes the installation and/or abandonment of monitoring wells, and soil vapor points. Additionally, PID screening of the well head space will be conducted during groundwater sampling activities.

GEI will conduct work zone monitoring for on-Site GEI employees during intrusive activities only. GEI will monitor and document daily Site conditions and operations and inform field representatives of results. ***If Action Levels are exceeded, the SSO will immediately implement Site action(s) according to Table 6 below and notify the PM and Safety Team***.

The following air monitoring equipment will be on Site:

- PID with 10.6 eV lamp or equivalent.
- Particulate Meter (PM-10 capable).

9.1 Equipment Use

9.1.1 Calibration

Air monitoring equipment will be calibrated and maintained in accordance with manufacturer's requirements. Calibrations will be recorded in the project notes daily or on a daily calibration form.

9.1.2 Photoionization Detector

Organic vapor concentrations will be measured using a PID during intrusive activities. During intrusive operations, organic vapor concentrations will be measured continuously. Organic vapor concentrations will be measured upwind of the work site(s) to determine background concentrations at least twice a day, (once in the morning and once in the afternoon). The SSO will interpret monitoring results using professional judgment and according to the alert and Action Limits set forth in the associated Site Work Plan.

9.2 Particulate Meter

A particulate meter will be used to measure airborne particulate matter during intrusive activities. Monitoring will be continuous, and readings will be averaged over a 15-minute period for comparison with the Action Levels. Monitoring personnel will make a best effort to collect dust monitoring data from downwind of the intrusive activity. If off-Site sources are considered to be the source of the measured dust, upwind readings will also be collected.

9.3 Action Levels

Table 6 provides a summary of real time air monitoring Action Levels and contingency plans for work zone activities. The below Action Levels are determined by halving the Permissible Exposure Limits (PELs) or Threshold Limit Values (TLVs) as set forth by OSHA and the American Conference of Government Industrial Hygienists (ACGIH). O2 values are based on the maximum use limits of a full-face respirator if oxygen were being displaced by a chemical.

Table 6. Real-Time Work Zone Air Monitoring Action Levels

Air Monitoring Instrument	Action Level (above background)	Site Action
PID	1.0 ppm	Use detector tube for benzene or zNose® to verify if concentration is benzene. No respiratory protection is required if benzene is not present.
PID	1.0 - 10 ppm	Use Sensidyne detector tube for naphthalene or zNose® to verify if concentration is naphthalene. No respiratory protection is required if naphthalene is not present.
	10 – 50 ppm	No respiratory protection is required if benzene or naphthalene is not present.
	50 – 100 ppm	Stop work, withdrawal from work area, institute engineering controls, if levels persist, upgrade to Level C.
	> 100 ppm	Stop work, withdraw from work area, notify PM and Safety Team.
Particulate Meter	150 µg/m^3	Implement work practices to reduce/minimize airborne dust generation, e.g., spray/misting of soil with water.

10. Site Control Measures

10.1 Buddy System

GEI personnel should be in line-of-sight or communication contact with another on-Site person. The other on-Site person should be aware of his or her role as a "buddy" and be able to provide assistance in the event of an emergency. A copy of this plan will be given to any person acting as a GEI "buddy" for informational purposes.

10.2 Sanitation for Temporary Work Sites

Sanitation requirements identified in the OSHA Standard 29 CFR 1926.51 "Sanitation" specifies that employees working at temporary project sites have at least one sanitary facility available to them. Temporary sanitary facilities including toilets will be available on-Site.

10.3 Illumination

Illumination requirements identified by OSHA are directed to work efforts inside buildings and/or during non-daylight hours. Activities planned for the Site are anticipated to occur outside during daylight hours. However, if work areas do not meet illumination requirements, they will be equipped with appropriate illumination that meets or exceeds requirements specified in OSHA Standard 29 CFR 1926.56 "Illumination." Employees will not work on sites that are not properly lighted.

10.4 Smoking

Smoking is prohibited at or in the vicinity of hazardous operations or materials. Where smoking is permitted, safe receptacles will be provided for smoking materials.

10.5 Alcohol and Drug Abuse Prevention

Alcohol and drugs will not be allowed on the Site. Project personnel under the influence of alcohol or drugs will not be allowed to enter the Site.

11. Incident Reporting

GEI will report incidents involving GEI personnel or subcontractor personnel, such as: lost time injuries, injuries requiring medical attention, near miss incidents, fires, fatalities, accidents involving the public, chemical spills, vehicle accidents, and property damage. The following steps must be followed when an incident occurs:

- In life-threatening situations, immediately call 9-1-1.
- Stop work activity to address any injury, illness, property damage, spill or other emergency.
- Immediately report any incidents to your Supervisor/Project Manager and Regional Health & Safety Officer.
- If your injury or illness is not life-threatening, call Medcor Triage at 1-800-775-5866 to speak with a medical professional.
- Complete an Incident Report Form immediately after addressing the incident.

For vehicle accidents involving another vehicle or damage to property, the employee will take pictures of each vehicle or property involved in the incident and obtain a police report. In some municipalities police will not be dispatched to a non-injury accident, but every effort needs to be made to try and obtain the report.

The Incident Report Form and the Near Miss Reporting Form can be found in Appendix D, on the GEI Health and Safety smartphone app, or on the Safety page of the GEI Intranet. To report subcontractor injuries or incidents, follow the same verbal reporting procedures and submit an email describing the event to the PM and the Safety Team.

11.1 Injury Triage Service

If a GEI employee experiences a work-related injury that is not life-threatening, the employee will initiate a call to Medcor Triage at 1-800-775-5866. The injured employee will detail any medical symptoms or complaints which will be evaluated by a Registered Nurse (RN) specially trained to perform telephonic triage. The RN will recommend first aid self- treatment or refer the injured employee for an off-Site medical evaluation by a health professional at a clinic within GEI's workers compensation provider network. GEI employees are still required to follow our Accident Reporting procedures as listed above.

12. Supplemental Contingency Plan Procedures

12.1 Hazard Communication Plan

GEI personnel have received hazard communication training as part of their annual health and safety training and new employee health and safety orientation training. Hazardous materials used on the Site will be properly labeled, stored, and handled. SDS will be available to potentially exposed employees.

12.2 Fire

In the event of a fire personnel will evacuate the area. GEI's field representative will contact the local fire department with jurisdiction and report the fire. Notification of evacuation will be made to the PM and the Safety Team. The field representative will account for GEI personnel and subcontractor personnel and report their status to the PM.

12.3 Medical Support

In case of minor injuries, on-site care will be administered with the Site first aid kit. For serious injuries, call 911 and request emergency medical assistance. Seriously injured persons should not be moved unless they are in immediate danger. Notify the PM and the Safety Team of the emergency.

Section 1 and Table 1 of this CHASP contain detailed emergency information, including directions to the nearest hospital, and a list of emergency services and their telephone numbers. In addition, Appendix A includes maps to the hospital and/or occupational health clinic. GEI field personnel will carry a cellular telephone.

12.4 Severe Weather

The contingency plan for severe weather includes reviewing the expected weather to determine if severe weather is in the forecast. Severe weather includes high winds over 30 miles per hour (mph), heavy rains or snow squalls, thunderstorms, tornados, and lightning storms. If severe weather is approaching, the decision to evacuate GEI personnel and subcontractor personnel from the Site will be the responsibility of GEI's field representative. Notification of evacuation will be made to the PM and the Safety Team. The field representative will account for GEI personnel and subcontractor personnel and report their status to the PM. If safe, work can resume 30 minutes after the last clap of thunder or flash of lightening.

12.5 Spills or Material Release

If a hazardous waste spill or material release occurs, if safe, the SSO or their representative will immediately assess the magnitude and potential seriousness of the spill or release based on the following:

- SDS for the material spilled or released.
- Source of the release or spillage of hazardous material.
- An estimate of the quantity released and the rate at which it is being released.
- The direction in which the spill or air release is moving.
- Personnel who may be or may have been in contact with the material, or air release, and possible injury or sickness as a result.
- Potential for fire and/or explosion resulting from the situation.
- Estimates of area under influence of release.

If the spill or release is determined to be within the on-Site emergency response capabilities, the SSO will verify implementation of the necessary remedial action. If the release is beyond the capabilities of the Site personnel, personnel will be evacuated from the immediate area and the local fire department will be contacted. The SSO will notify the PM and the Safety Team.

13. Health and Safety Plan Sign-Off

GEI personnel conducting site activities will be familiar with the information in this CHASP. After reviewing this plan, please sign the copy in the project files, and bring a copy of the plan with you to the Site. By signing this site-specific CHASP you are agreeing that you have read, understand, and will adhere to the provisions described in this plan while working on the Project Site below.

Site Name: NYSDEC BCP Site No. C231102
207th Street / 9th Avenue
Investigation: NYSDEC BCP Remedial Action
GEI Project No: 1801342

Print Name	Signature
Project Manager: Wendy Monterosso	

Appendix A

Map to Hospital and Occupational Health Clinic

YOUR TRIP TO:

5141 Broadway

7 MIN | 1.4 MI

Est. fuel cost: $0.17

Trip time based on traffic conditions as of 1:11 PM on April 16, 2018. Current Traffic: Moderate

Print a full health report of your car with HUM vehicle diagnostics **(800) 906-2501**

1. Start out going **southwest** on 9th Ave toward W 207th St.

Then 0.03 miles — 0.03 total miles

2. Take the 1st **right** onto W 207th St.

If you reach W 206th St you've gone a little too far.

Then 0.11 miles — 0.15 total miles

3. Take the 1st **right** onto 10th Ave.

Ten-Tan is on the corner.

If you are on W 207th St and reach Post Ave you've gone a little too far.

Then 0.53 miles — 0.68 total miles

4. Turn **slight right** onto Broadway/US-9 N.

Broadway is just past W 216th St.

Then 0.43 miles — 1.10 total miles

5. Turn **left** onto W 228th St.

W 228th St is just past W 225th St.

Rite Aid is on the corner.

If you reach W 230th St you've gone about 0.1 miles too far.

Then 0.02 miles — 1.12 total miles

6. Turn **sharp left** onto Broadway.

If you reach Marble Hill Ln you've gone a little too far.

Then 0.30 miles — 1.42 total miles

7. 5141 Broadway, New York, NY 10034-1159, 5141 BROADWAY is on the **right**.

If you reach W 220th St you've gone a little too far.

Use of directions and maps is subject to our Terms of Use. We don't guarantee accuracy, route conditions or usability. You assume all risk of use.

Book a hotel tonight and save with some great deals!

(1-877-577-5766)

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(1-888-461-3625)

YOUR TRIP TO:

177 Dyckman St, New York, NY, 10040-1069

3 MIN | 0.7 MI

Est. fuel cost: $0.08

Trip time based on traffic conditions as of 1:16 PM on April 16, 2018. Current Traffic: Heavy

Print a full health report of your car with HUM vehicle diagnostics **(800) 906-2501**

1. Start out going **southwest** on 9th Ave toward W 207th St.

Then 0.03 miles — 0.03 total miles

2. Take the 1st **right** onto W 207th St.

If you reach W 206th St you've gone a little too far.

Then 0.22 miles — 0.26 total miles

3. Take the 3rd **left** onto Sherman Ave.

Sherman Ave is just past Post Ave.

If you reach Vermilyea Ave you've gone a little too far.

Then 0.35 miles — 0.60 total miles

4. Take the 3rd **right** onto Dyckman St.

Dyckman St is 0.1 miles past Academy St.

Betel Party Supply is on the right.

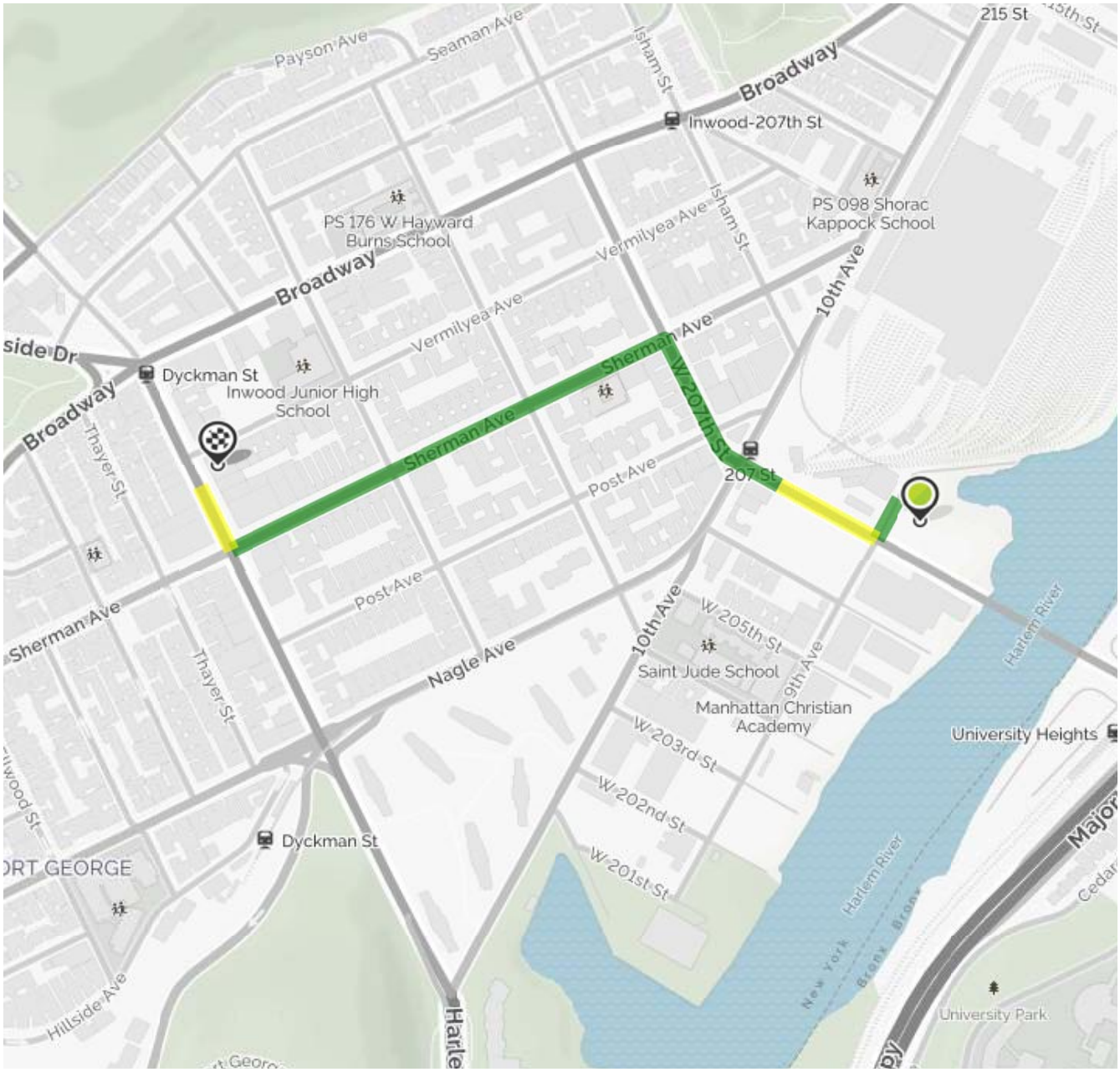
If you reach Thayer St you've gone a little too far.

Then 0.05 miles — 0.66 total miles

5. 177 Dyckman St, New York, NY 10040-1069, 177 DYCKMAN ST is on the **right**.

If you reach Vermilyea Ave you've gone a little too far.

Use of directions and maps is subject to our Terms of Use. We don't guarantee accuracy, route conditions or usability. You assume all risk of use.



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(1-888-461-3625)

Appendix B

Safety Data Sheets

Indoor Air Quality (IAQ)

Volatile Organic Compounds' Impact on Indoor Air Quality

On this page:

Introduction

Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands.

Organic chemicals are widely used as ingredients in household products. Paints, varnishes;and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored.

EPA's Office of Research and Development's "Total Exposure Assessment Methodology (TEAM) Study" (Volumes I through IV, completed in 1985) found levels of about a dozen common organic pollutants to be 2 to 5 times higher inside homes than outside, regardless of whether the homes were located in rural or highly industrial areas. TEAM studies indicated that while people are using products containing organic chemicals, they can expose themselves and others to very high pollutant levels, and elevated concentrations can persist in the air long after the activity is completed.

Sources of VOCs

Household products, including:

- paints, paint strippersand other solvents
- wood preservatives
- aerosol sprays
- cleansers and disinfectants

- moth repellents and air fresheners
- stored fuels and automotive products
- hobby supplies
- dry-cleaned clothing
- pesticide

Other products, including:

- building materials and furnishings
- office equipment such as copiers and printers, correction fluids and carbonless copy paper
- graphics and craft materials including glues and adhesives, permanent markers and photographic solutions.

Health Effects

Health effects may include:

- Eye, nose and throat irritation
- headaches, loss of coordination and nausea
- damage to liver, kidney and central nervous system
- Some organics can cause cancer in animals, some are suspected or known to cause cancer in humans.

Key signs or symptoms associated with exposure to VOCs include:

- conjunctival irritation
- nose and throat discomfort
- headache
- allergic skin reaction
- dyspnea
- declines in serum cholinesterase levels
- nausea
- emesis
- epistaxis
- fatigue
- dizziness

The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect.

As with other pollutants, the extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed. Among the immediate symptoms that some people have experienced soon after exposure to some organics include:

- Eye and respiratory tract irritation
- headaches
- dizziness
- visual disorders and memory impairment

At present, not much is known about what health effects occur from the levels of organics usually found in homes.

- Search EPA's Integrated Risk Information System (IRIS)
    - A compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects
- EPA's Office of Drinking Water Regulations
    - List of Contaminants and Their MCLs: Organic Chemicals
- U.S. Geology Survey's National Water-Quality Assessment (NAWQA) Program
    - Information on VOCs in Water Sources

Levels in Homes

Studies have found that levels of several organics average 2 to 5 times higher indoors than outdoors. During and for several hours immediately after certain activities, such as paint stripping, levels may be 1,000 times background outdoor levels.

Steps to Reduce Exposure

- Increase ventilation when using products that emit VOCs.
- Meet or exceed any label precautions.
- Do not store opened containers of unused paints and similar materials within the school.
- Formaldehyde, one of the best known VOCs, is one of the few indoor air pollutants that can be readily measured.
    - Identify, and if possible, remove the source.
    - If not possible to remove, reduce exposure by using a sealant on all exposed surfaces of paneling and other furnishings.
- Use integrated pest management techniques to reduce the need for pesticides.
- Use household products according to manufacturer's directions.
- Make sure you provide plenty of fresh air when using these products.
- Throw away unused or little-used containers safely; buy in quantities that you will use soon.
- Keep out of reach of children and pets.
- Never mix household care products unless directed on the label.

Follow label instructions carefully.

Potentially hazardous products often have warnings aimed at reducing exposure of the user. For example, if a label says to use the product in a well-ventilated area, go outdoors or in areas equipped with an exhaust fan to use it. Otherwise, open up windows to provide the maximum amount of outdoor air possible.

Throw away partially full containers of old or unneeded chemicals safely.

Because gases can leak even from closed containers, this single step could help lower concentrations of organic chemicals in your home. (Be sure that materials you decide to keep are stored not only in a well-ventilated area but are also safely out of reach of children.) Do not simply toss these unwanted products in the garbage can. Find out if your local government or any organization in your

community sponsors special days for the collection of toxic household wastes. If such days are available, use them to dispose of the unwanted containers safely. If no such collection days are available, think about organizing one.

Buy limited quantities.

If you use products only occasionally or seasonally, such as paints, paint strippers and kerosene for space heaters or gasoline for lawn mowers, buy only as much as you will use right away.

Keep exposure to emissions from products containing methylene chloride to a minimum.

Consumer products that contain methylene chloride include paint strippers, adhesive removers and aerosol spray paints. Methylene chloride is known to cause cancer in animals. Also, methylene chloride is converted to carbon monoxide in the body and can cause symptoms associated with exposure to carbon monoxide. Carefully read the labels containing health hazard information and cautions on the proper use of these products. Use products that contain methylene chloride outdoors when possible; use indoors only if the area is well ventilated.

Keep exposure to benzene to a minimum.

Benzene is a known human carcinogen. The main indoor sources of this chemical are:

- environmental tobacco smoke
- stored fuels
- paint supplies
- automobile emissions in attached garages

Actions that will reduce benzene exposure include:

- eliminating smoking within the home
- providing for maximum ventilation during painting
- discarding paint supplies and special fuels that will not be used immediately

Keep exposure to perchloroethylene emissions from newly dry-cleaned materials to a minimum.

Perchloroethylene is the chemical most widely used in dry cleaning. In laboratory studies, it has been shown to cause cancer in animals. Recent studies indicate that people breathe low levels of this chemical both in homes where dry-cleaned goods are stored and as they wear dry-cleaned clothing. Dry cleaners recapture the perchloroethylene during the dry-cleaning process so they can save money by re-using it, and they remove more of the chemical during the pressing and finishing processes. Some dry cleaners, however, do not remove as much perchloroethylene as possible all of the time.

Taking steps to minimize your exposure to this chemical is prudent.

- If dry-cleaned goods have a strong chemical odor when you pick them up, do not accept them until they have been properly dried.

- If goods with a chemical odor are returned to you on subsequent visits, try a different dry cleaner.

Standards or Guidelines

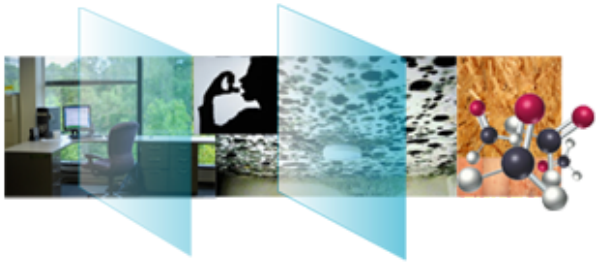
No federally enforceable standards have been set for VOCs in non-industrial settings. To learn more about VOC's, including current guidelines or recommendations set by various organizations for formaldehyde concentrations, visit Lawrence Berkeley National Laboratory's Indoor Air Quality Scientific Findings Resource Bank.

Additional Resources

- ASHRAE: Indoor Air Quality Guide, Strategies 5.1 and 5.2
- ASHRAE Standard 189.1-2014, Sections 10.3.1.4 and 10.3.1.4 (b) 1
- California Department of Public Health: Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers (Emission Testing Method for California Specification 01350)
- California Title 17 ATCM to Reduce Formaldehyde Emissions from Composite Wood Products
- Carpet and Rug Institute: Green Label Plus
- Collaborative for High Performance Schools: High Performance Products Database
- EPA: Formaldehyde Standards for Composite Wood Products
- Indoor Air Fact Sheet No. 4 (revised) - Sick Building Syndrome
    - Explains the term "sick building syndrome" (SBS) and "building related illness" (BRI). Discusses causes of sick building syndrome, describes building investigation procedures and provides general solutions for resolving the syndrome.
- Indoor Air Pollution: An Introduction for Health Professionals
    - Assists health professionals (especially the primary care physician) in diagnosis of patient symptoms that could be related to an indoor air pollution problem. Addresses the health problems that may be caused by contaminants encountered daily in the home and office. Organized according to pollutant or pollutant groups such as environmental tobacco smoke, VOCs, biological pollutants and sick building syndrome, this booklet lists key signs and symptoms from exposure to these pollutants, provides a diagnostic checklist and quick reference summary, and includes suggestions for remedial action. Also includes references for information contained in each section. This booklet was coauthored with the American Lung Association,

the American Medical Association and the U.S. Consumer Product Safety Commission.

Last updated on May 16, 2016



SVOCs and Health

Semivolatile organic compounds (SVOCs) are a subgroup of VOCs that tend to have a higher molecular weight and higher boiling point temperature than other VOCs. A comprehensive review of SVOCs in indoor environments, from which much of the below material is taken, is provided by Weschler and Nazaroff [92]. An additional overview is provided by Xu and Zhang [93]. Compounds considered to be SVOCs have boiling points ranging from 240-260 °C to 380-400°C. Despite these high boiling points, SVOCs such as plasticizers can vaporize from the surfaces of products containing them because they are not "bound" to the materials. They are present partly as gaseous airborne chemicals and partly as chemicals adsorbed on (attached reversibly to, without bonding) indoor surfaces and onto microscopic airborne and settled particles, although those with large molecular weight and low vapor pressures tend to predominate on surfaces and in dust [92]. SVOCs are ubiquitous in indoor environments, as they are released from multiple sources in the home and adsorb to all indoor surfaces.

People are exposed to SVOCs via multiple routes. They inhale air containing gaseous SVOCs or SVOCs adsorbed on airborne particles, they touch SVOC coated surfaces, they ingest dust containing SVOCs (a particularly important exposure route for infants), and the foods they eat contain SVOCs. Also, it has recently been recognized that airborne SVOCs can adsorb directly on the skin and then move into the body [94].

SVOCs that may be found in homes and other buildings, and also as detectable body burdens of occupants, include pesticides, plasticizers, and flame retardants. It has been calculated that many SVOCs have long persistence indoors. Even if the original sources are removed, SVOCs will persist indoors for weeks or years because all indoor surfaces have become coated with SVOCs. Calculations also indicate that human uptake of SVOCs by absorption on the skin can be much larger than previously thought, potentially equal to or in some cases exceeding intake through inhalation [95].

Less is known about SVOCs than VOCs in general, not because they are less important, but because they are more challenging to measure. Some SVOCs such as polycyclic aromatic hydrocarbons (PAHs), produced by combustion, have caused human exposures for millennia, whereas the manmade SVOCs have been present only on the order of decades. SVOCs are included as active ingredients in cleaning agents, pesticides, and personal care products, as well as substantial additives in floor coverings, furnishings, and electronic components. Food can also be a substantial, and sometimes, dominant sources of people's uptake of SVOCs. Because they are released slowly from their sources, adsorb readily onto surfaces, and can remain indoors for years after they are introduced, even if the original source is removed, they can be compared to outdoor persistent organic pollutants. The U.S. population has measurable levels in their bodies of more than 100 SVOCs (e.g., 95th

percentile values of 360, 270, 90, and 81mg/g creatinine in urine for triclosan, DEHP, BBzP, and DBP, respectively, with body burdens of many others in common use not known, because they are not routinely measured.

The health effects of a specific SVOC depend on its chemical nature and on the degree of exposure, which can occur through a combination of ingestion, respiration, and skin absorption. Individual susceptibility factors can also be important, and much attention has been focused on the developing fetus. Knowledge about effects from indoor exposures to SVOCs is limited. Some SVOCs are known to be toxic, such as dioxins and pentachlorophenol; some are no longer used because of demonstrated or suspected health effects, such as polybrominated biphenyls; and concerns are emerging about potential health effects of others. Health effects now associated with specific SVOCs include allergic symptoms, retarded reproductive development, and altered semen quality with phthalates, and lower birth weight with perfluorooctane sulfonate and perfluorooctanoate. For instance, Hsu [96] found that allergy or asthma in children was associated in a significant, dose-response manner with increased levels of benzylbutyl phthalate in home dust. A broad and growing concern is about SVOCs with chemical structures that may mimic human hormones and increase or decrease endocrine activity. These SVOCs, called endocrine disrupting chemicals (EDCs), are discussed further below.

A substantial discussion of the occurrence, physical properties, and dynamics of SVOCs in indoor environments, with the goal of understanding human exposures indoors, is provided by Weschler and Nazaroff [92], along with information on typical U.S. body burdens of many compounds.

SVOCS that are considered to be endocrine-disrupting chemicals (EDCs) include polybrominated flame retardants, phthalates, pesticides, antimicrobials, and polycyclic aromatic hydrocarbons. EDCs can interfere with the "synthesis, secretion, transport, activity, or elimination of natural hormones," which can cause a wide range of developmental and reproductive abnormalities [97, 98]. Scientific observations suggest that, acting through a very wide variety of pathways in the body, EDCs may contribute to cancer, diabetes, obesity, and infertility [99] as well as autism and attention deficit disorder, although supporting evidence is limited. Exposures to EDCs in utero, when the fetus is developing, are of special concern because the development process may be affected by very small amounts of EDCs. Additional information on the range of EDCs, the evidence for their health effects, proposed mechanisms of action, and the difficulties of assessing the risks, is provided by Casals-Casas et al. [98].

Many brominated and chlorinated flame retardants, commonly used in many household items and electronics, are SVOCs and have been identified in the body burdens (e.g., in blood or urine) of human populations. They have also been associated with adverse health effects in animals and humans, including endocrine and thyroid disruption, immunotoxicity, reproductive toxicity, cancer, and adverse effects on fetal and child development and neurologic function [100]. Polybrominated diphenyl ethers (PBDEs) and other flame retardants have been banned or phased out by manufacturers because of their environmental persistence and toxicity, but they have been replaced by other chemicals of similar structure but unknown toxicity. A summary of the known toxic effects of commonly used flame retardants is provided by Shaw et al. [100]. A review of animal studies of brominated flame retardants, on the other hand, found that the available animal evidence is not sufficient to document a causal relationship between early exposures and later motor activity effects, and noted that human studies are generally lacking [101].

A recent review of the literature on indoor exposures and asthma exacerbations [46] summarized current evidence related to plasticizers and pesticides. For plasticizers, recent studies have demonstrated associations between the presence of plastic materials in homes and increased allergies, respiratory symptoms, and diagnosed asthma [40, 102-104], but have not evaluated effects on asthma exacerbation. No evidence was identified on the relationship of indoor pesticide exposures and asthma exacerbation. The review concluded that there was inadequate or insufficient evidence to determine whether or not an association existed between non-occupational exposure to plasticizers, or to pesticides, and exacerbations of asthma.

Summary

For SVOCs overall, there is persuasive evidence that they can cause a variety of adverse health effects, if the exposures are sufficient. The SVOC situation indoors is complex and continually changing. There are multiple SVOCs, multiple routes of exposures to SVOCs, and the timing of SVOC exposures can be important, with in-utero exposures a particular concern for EDCs. There is an ongoing process in which some SVOCs, strongly suspected to pose health risks, are phased out by manufacturers and replaced with new SVOCs with unknown risks. For some SVOCs, foods are considered the predominant source of exposure. At present, the extent of health risks from indoor airborne SVOCs, and from people's contact with indoor SVOC-contaminated surfaces, is uncertain.

Target Compound List – Semi-volatile Organic Compounds

Source: https://www.epa.gov/sites/production/files/2015-06/documents/8270.pdf

1,2-Dichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Nitroaniline
2-Nitrophenol
2,2'-oxybis (1-Chloropropane)
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dinitrotoluene
3-Nitroaniline
3,3'-Dichlorobenzidine
4-Bromophenyl-phenylether
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl-phenyl ether
4-Methylphenol
4-Nitroaniline
4-Nitrophenol
4,6-Dinitro-2-methylphenol

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
bis(2-Chloroethoxy)-methane
bis(2-Chloroethyl) ether
bis(2-Ethylhexyl)phthalate
Butylbenzylphthalate
Carbazole
Chrysene
Di-n-butylphthalate
Di-n-octylphthalate
Dibenz(a,h)anthracene
Dibenzofuran
Diethylphthalate
Dimethylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone

N-Nitroso-di-n-propylamine
N-nitrosodiphenylamine
Naphthalene
Nitrobenzene
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

Polycyclic Aromatic Hydrocarbons (PAHs) - ToxFAQs™

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.
- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

Polycyclic Aromatic Hydrocarbons

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

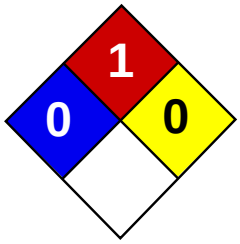
Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



Health	0
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Anthracene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Anthracene

Catalog Codes: SLA3670

CAS#: 120-12-7

RTECS: CA9350000

TSCA: TSCA 8(b) inventory: Anthracene

CI#: Not available.

Synonym:

Chemical Formula: C14H10

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
Anthracene	120-12-7	100

Toxicological Data on Ingredients: Anthracene LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of inhalation. Hazardous in case of skin contact (permeator), of ingestion. 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:
Very hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of inhalation. Hazardous in case of skin contact (permeator), of ingestion. CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Clear evidence.) by NTP, + (Proven.) by OSHA. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

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 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. 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 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: May be combustible at high temperature.

Auto-Ignition Temperature: 540°C (1004°F)

Flash Points: CLOSED CUP: 121°C (249.8°F).

Flammable Limits: LOWER: 0.6%

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:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

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. 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:
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 breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes.

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: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Slight.

Taste: Not available.

Molecular Weight: 178.22 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 342°C (647.6°F)

Melting Point: 218°C (424.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.25 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 6.15 (Air = 1)

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: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Clear evidence.) by NTP, + (Proven.) by OSHA. Causes damage to the following organs: kidneys, lungs, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant, sensitizer), of inhalation. Hazardous in case of skin contact (permeator), of ingestion.

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: 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: 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:
Pennsylvania RTK: Anthracene Massachusetts RTK: Anthracene TSCA 8(b) inventory: Anthracene SARA 313 toxic chemical notification and release reporting: Anthracene CERCLA: Hazardous substances.: Anthracene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R38- Irritating to skin. R41- Risk of serious damage to eyes. R43- May cause sensitization by skin contact. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 0

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

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. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 11:19 AM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

Version 5.7
Revision Date 06/02/2016
Print Date 07/28/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benz[*a*]anthracene

Product Number : B2209
Brand : Aldrich
Index-No. : 601-033-00-9

CAS-No. : 56-55-3

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)
Carcinogenicity (Category 1B), H350
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)
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.
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.
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-Benzanthracene Tetraphene
Formula	:	$C_{18}H_{12}$
Molecular weight	:	228.29 g/mol
CAS-No.	:	56-55-3
EC-No.	:	200-280-6
Index-No.	:	601-033-00-9

Hazardous components

Component	Classification	Concentration
Benz[a]anthracene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; 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
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 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 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.

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
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: 157 - 159 °C (315 - 318 °F)
f)	Initial boiling point and boiling range	437.6 °C (819.7 °F)
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
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
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 - > 200 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

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:	2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)
IARC:	2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)
NTP:	Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)
NTP:	Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)
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: Not available

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
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)
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. (Benz[a]anthracene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[a]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
Benz[a]anthracene	56-55-3	1993-04-24

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	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. Benz[a]anthracene	56-55-3	2007-09-28
WARNING! This product contains a chemical known to the State of California to cause cancer. Benz[a]anthracene	56-55-3	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
H350	May cause 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: 5.7 Revision Date: 06/02/2016 Print Date: 07/28/2016

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Benzo[a]pyrene, 98%**

Cat No. : **AC105600010; AC105601000**

Synonyms Benzo[def]chrysene.; 3,4-Benzopyrene; 3,4-Benzpyrene

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
Germ Cell Mutagenicity	Category 1A
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1A

Label Elements

Signal Word
Danger

Hazard Statements
May cause an allergic skin reaction
May cause genetic defects
May cause cancer
May damage fertility or the unborn child

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
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
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)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Benzo[a]pyrene	50-32-8	> 96

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 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

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	Flammability	Instability	Physical hazards
2	0	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. 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
Benzo[a]pyrene		TWA: 0.2 mg/m^3	

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Benzo[a]pyrene	TWA: 0.005 mg/m^3		TWA:

Legend

OSHA - Occupational Safety and Health Administration

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	Powder Solid
Appearance	Dark yellow
Odor	aromatic
Odor Threshold	No information available
pH	
Melting Point/Range	175 179 °C
Boiling Point/Range	°C @ 760 mmHg
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	No information available
Vapor Density	No information available
Relative Density	No information available
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	C20H12
Molecular Weight	252.31

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

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
Benzo[a]pyrene	50-32-8	Group 1	Reasonably Anticipated	A2	X	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 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

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Benzo[a]pyrene	Group III Chemical	Not applicable	Not applicable

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.

Component	log Pow
Benzo[a]pyrene	6.06

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
Benzo[a]pyrene - 50-32-8	U022	-

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

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Benzo[a]pyrene	X	X	-	200-028-5	-		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 %
Benzo[a]pyrene	50-32-8	> 96	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
Benzo[a]pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzo[a]pyrene	1 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Benzo[a]pyrene	50-32-8	Carcinogen	0.06 µg/day	Carcinogen

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo[a]pyrene	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

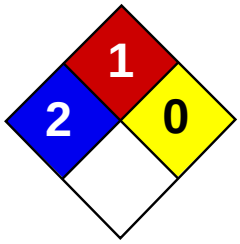
16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

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	1
Reactivity	0
Personal Protection	C

Material Safety Data Sheet
Pyrene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Pyrene

Catalog Codes: SLP3868

CAS#: 129-00-00

RTECS: UR2450000

TSCA: TSCA 8(b) inventory: Pyrene

CI#: Not available.

Synonym: Benzo(D,E,F)phenanthrene

Chemical Name: Pyrene

Chemical Formula: C16-H10

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
Pyrene	129-00-00	100

Toxicological Data on Ingredients: Pyrene: ORAL (LD50): Acute: 2700 mg/kg [Rat]. 800 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 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. 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.

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: 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: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of heat, of combustible materials. 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. Slightly explosive in presence of heat. Non-explosive in presence of open flames and sparks.

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: 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. 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:
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. 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:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F). Preferably refrigerate.

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. Synthetic apron. Gloves (impervious).

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: Solid. (Crystalline solid. Powdered solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 202.26 g/mole

Color: Yellow.

pH (1% soln/water): Not applicable.

Boiling Point: 404°C (759.2°F)

Melting Point: 151.2°C (304.2°F)

Critical Temperature: Not available.

Specific Gravity: 1.271 @ 23 C (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 4.9

Ionicity (in Water): Not available.

Dispersion Properties:
Is not dispersed in cold water, hot water. See solubility in diethyl ether.

Solubility:
Soluble in diethyl ether. Insoluble in cold water, hot water. Pyrene is fairly soluble in organic solvents. It is soluble in alcohol, benzene, carbon disulfide, ether, petroleum ether, and toluene

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.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

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): 800 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

Other Toxic Effects on Humans:
Hazardous in case of ingestion, 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:
May affect genetic material (mutagenic). May cause cancer (tumorigenic) according to animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. May be absorbed through skin. Eyes: May cause eye irritation. Conjunctival irritation may be noted. Inhalation: May cause respiratory tract irritaiton. Ingestion: May cause gastrointestinal tract irritation. May affect behavior/Central Nervous System (excitation and muscel spasicity), liver and urinary system, and immune system, and blood.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 1.8 mg/l 48 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 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:
Connecticut carcinogen reporting list.: Pyrene Illinois chemical safety act: Pyrene New York release reporting list: Pyrene Pennsylvania RTK: Pyrene Massachusetts RTK: Pyrene Massachusetts spill list: Pyrene New Jersey: Pyrene New Jersey spill list: Pyrene Louisiana RTK reporting list: Pyrene Louisiana spill reporting: Pyrene California Director's list of Hazardous Substances: Pyrene TSCA 8(b) inventory: Pyrene TSCA 8(a) CAIR: Pyrene TSCA 8(d) H and S data reporting: Pyrene: June 1, 1987-June1, 1997 SARA 302/304/311/312 extremely hazardous substances: Pyrene CERCLA: Hazardous substances.: Pyrene: 5000 lbs. (2268 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: C

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious). Synthetic apron. Not applicable. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 06:14 PM

Last Updated: 05/21/2013 12:00 PM

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lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Types of Pesticide Ingredients

Pesticide active ingredients are described by the types of pests they control or how they work. People often use the term "pesticide" to refer only to insecticides, but it actually applies to all the substances used to control pests.

Well known pesticides include:

- insecticides,
- herbicides,
- rodenticides, and
- fungicides.

Less well-known pesticides include:

- disinfectants,
- attractants,
- plant defoliants,
- swimming pool treatments, and
- plant growth regulators.

The following list will help you understand the wide range of types of pesticides:

- **Algicides** kill algae in lakes, canals, swimming pools, water tanks, and other sites.
- **Antifoulants** kill or repel organisms that attach to underwater surfaces, such as barnacles that cling to boat bottoms.
- **Antimicrobials** kill microorganisms such as bacteria and viruses.
- **Attractants** lure pests to a trap or bait, for example, attract an insect or rodent into a trap. (However, food is not considered a pesticide when used as an attractant.)
- **Biopesticides** are derived from natural materials such as animals, plants, bacteria, and certain minerals.
- **Biocides** kill microorganisms.
- **Defoliants** cause leaves or foliage to drop from a plant, usually to facilitate harvest.
- **Desiccants** promote drying of living tissues, such as unwanted plant tops.
- **Disinfectants and sanitizers** kill or inactivate disease-producing microorganisms on inanimate objects.
- **Fungicides** kill fungi (including blights, mildews, molds, and rusts).
- **Fumigants** produce gas or vapor intended to destroy pests, for example in buildings or soil.
- **Herbicides** kill weeds and other plants that grow where they are not wanted.
- **Insect growth regulators** disrupt the molting, maturing from pupal stage to adult, or other life processes of insects.
- **Insecticides** kill insects and other arthropods.
- **Miticides** (also called acaricides) kill mites that feed on plants and animals.

- **Microbial pesticides** are microorganisms that kill, inhibit, or out-compete pests, including insects or other microorganism pests.
- **Molluscicides** kill snails and slugs.
- **Nematicides** kill nematodes (microscopic, worm-like organisms that feed on plant roots).
- **Ovicides** kill eggs of insects and mites.
- **Pheromones** disrupt the mating behavior of insects.
- **Plant growth regulators** alter the expected growth, flowering, or reproduction rate of plants (does not include fertilizers).
- **Plant Incorporated Protectants** are substances that plants produce from genetic material that has been added to the plant.
- **Repellents** repel pests, including insects (such as mosquitoes) and birds.
- **Rodenticides** control mice and other rodents.

Last updated on January 7, 2016

Polychlorinated Biphenyls (PCBs)

CAS ID #: 1336-36-3, 11097-69-1

Affected Organ Systems: Dermal (Skin), Developmental (effects during periods when organs are developing) , Endocrine (Glands and Hormones), Hepatic (Liver), Immunological (Immune System), Neurological (Nervous System)

Cancer Classification: NTP: Reasonably Anticipated to be a Human Carcinogen

Chemical Classification: Dioxins, Furans, PCBs (contain phenyl rings of carbon atoms), Pesticides (chemicals used for killing pests, such as rodents, insects, or plants)

Summary: Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

Community Members

ToxFAQs (/toxfaqs/tf.asp?id=140&tid=26)

Fact sheet that answers the most frequently asked questions about a contaminant and its health effects.

Public Health Statement (/phs/phs.asp?id=139&tid=26)

Summary about a hazardous substance taken from Chapter One of its respective ATSDR Toxicological Profile.

National Report on Human Exposure to Environmental Chemicals (http://www.cdc.gov/exposurereport/)

Provides an ongoing assessment of the exposure of the U.S. population to environmental chemicals using biomonitoring.

Toxicological and Health Professionals

Toxicological Profile (/toxprofiles/tp.asp?id=142&tid=26)

Succinctly characterizes the toxicologic and adverse health effects information for a hazardous substance.

Addendum to the Profile (PDF, 1325KB*) (http://www.atsdr.cdc.gov/toxprofiles/pcbs_addendum.pdf)

Addendum to the Toxicological Profile for Polychlorinated Biphenyls (PCBs) (April 2011)

Priority List of Hazardous Substances (/spl/)

Prioritization of substances based on a combination of their frequency, toxicity, and potential for human exposure at National Priorities List (NPL) sites.

Minimal Risk Levels (MRL) (/mrls/mrllist.asp#26tag)

The MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse, non-cancer health effects over a specified duration of exposure. The information in this MRL serves as a screening tool to help public health professionals decide where to look more closely to evaluate possible risk of adverse health effects from human exposure.

Interaction Profiles (/interactionprofiles/index.asp)

Succintly characterizes the toxicologic and adverse health effects information for mixtures of hazardous substances.

- Page last reviewed: March 3, 2011
- Page last updated: March 3, 2011
- Content source: Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov)

Agency for Toxic Substances and Disease Registry, 4770 Buford Hwy NE, Atlanta, GA 30341
Contact CDC: 800-232-4636 / TTY: 888-232-6348

USA.gov Government Made Easy

Heavy Metals Toxicity and the Environment

Source: US National Library of Medicine National Institutes of Health

Abstract

Heavy metals are naturally occurring elements that have a high atomic weight and a density at least 5 times greater than that of water. Their multiple industrial, domestic, agricultural, medical and technological applications have led to their wide distribution in the environment, raising concerns over their potential effects on human health and the environment. Their toxicity depends on several factors including the dose, route of exposure, and chemical species, as well as the age, gender, genetics, and nutritional status of exposed individuals. Because of their high degree of toxicity, arsenic, cadmium, chromium, lead, and mercury rank among the priority metals that are of public health significance. These metallic elements are considered systemic toxicants that are known to induce multiple organ damage, even at lower levels of exposure. They are also classified as human carcinogens (known or probable) according to the U.S. Environmental Protection Agency, and the International Agency for Research on Cancer.

This review provides an analysis of their environmental occurrence, production and use, potential for human exposure, and molecular mechanisms of toxicity, genotoxicity, and carcinogenicity.

Introduction

Heavy metals are defined as metallic elements that have a relatively high density compared to water. With the assumption that heaviness and toxicity are inter-related, heavy metals also include metalloids, such as arsenic, that are able to induce toxicity at low level of exposure. In recent years, there has been an increasing ecological and global public health concern associated with environmental contamination by these metals. Also, human exposure has risen dramatically as a result of an exponential increase of their use in several industrial, agricultural, domestic and technological applications. Reported sources of heavy metals in the environment include geogenic, industrial, agricultural, pharmaceutical, domestic effluents, and atmospheric sources. Environmental pollution is very prominent in point source areas such as mining, foundries and smelters, and other metal-based industrial operations.

Although heavy metals are naturally occurring elements that are found throughout the earth's crust, most environmental contamination and human exposure result from anthropogenic activities such as mining and smelting operations, industrial production and use, and domestic and agricultural use of metals and metal-containing compounds. Environmental contamination can also occur through metal corrosion, atmospheric deposition, soil erosion of metal ions and leaching of heavy metals, sediment re-suspension and metal evaporation from water resources to soil and ground water. Natural phenomena such as weathering and volcanic eruptions have also been reported to significantly contribute to heavy metal pollution. Industrial sources include metal processing in refineries, coal burning in power plants, petroleum combustion, nuclear power stations and high tension lines, plastics, textiles, microelectronics, wood preservation and paper processing plants.

It has been reported that metals such as cobalt (Co), copper (Cu), chromium (Cr), iron (Fe), magnesium (Mg), manganese (Mn), molybdenum (Mo), nickel (Ni), selenium (Se) and zinc (Zn) are essential nutrients that are required for various biochemical and physiological functions. Inadequate supply of these micro-nutrients results in a variety of deficiency diseases or syndromes.

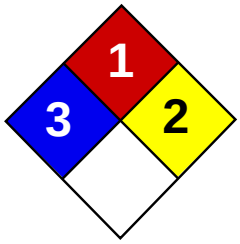
Heavy metals are also considered as trace elements because of their presence in trace concentrations (ppb range to less than 10 ppm) in various environmental matrices. Their bioavailability is influenced by physical factors such as temperature, phase association, adsorption and sequestration. It is also affected by chemical factors that influence speciation at thermodynamic equilibrium, complexation kinetics, lipid solubility and octanol/water partition coefficients. Biological factors such as species characteristics, trophic interactions, and biochemical/physiological adaptation, also play an important role.

The essential heavy metals exert biochemical and physiological functions in plants and animals. They are important constituents of several key enzymes and play important roles in various oxidation-reduction reactions. Copper for example serves as an essential co-factor for several oxidative stress-related enzymes including catalase, superoxide dismutase, peroxidase, cytochrome c oxidases, ferroxidases, monoamine oxidase, and dopamine β-monooxygenase. Hence, it is an essential nutrient that is incorporated into a number of metalloenzymes involved in hemoglobin formation, carbohydrate metabolism, catecholamine biosynthesis, and cross-linking of collagen, elastin, and hair keratin. The ability of copper to cycle between an oxidized state, Cu(II), and reduced state, Cu(I), is used by cuproenzymes involved in redox reactions. However, it is this property of copper that also makes it potentially toxic because the transitions between Cu(II) and Cu(I) can result in the generation of superoxide and hydroxyl radicals. Also, excessive exposure to copper has been linked to cellular damage leading to Wilson disease in humans. Similar to copper, several other essential elements are required for biologic functioning, however, an excess amount of such metals produces cellular and tissue damage leading to a variety of adverse effects and human diseases. For some including chromium and copper, there is a very narrow range of concentrations between beneficial and toxic effects. Other metals such as aluminium (Al), antinomy (Sb), arsenic (As), barium (Ba), beryllium (Be), bismuth (Bi), cadmium (Cd), gallium (Ga), germanium (Ge), gold (Au), indium (In), lead (Pb), lithium (Li), mercury (Hg), nickel (Ni), platinum (Pt), silver (Ag), strontium (Sr), tellurium (Te), thallium (Tl), tin (Sn), titanium (Ti), vanadium (V) and uranium (U) have no established biological functions and are considered as non-essential metals.

In biological systems, heavy metals have been reported to affect cellular organelles and components such as cell membrane, mitochondrial, lysosome, endoplasmic reticulum, nuclei, and some enzymes involved in metabolism, detoxification, and damage repair. Metal ions have been found to interact with cell components such as DNA and nuclear proteins, causing DNA damage and conformational changes that may lead to cell cycle modulation, carcinogenesis or apoptosis. Several studies from our laboratory have demonstrated that reactive oxygen species (ROS) production and oxidative stress play a key role in the toxicity and carcinogenicity of metals such as arsenic, cadmium, chromium, lead, and mercury. Because of their high degree of toxicity, these five elements rank among the priority metals that are of great public health significance.

They are all systemic toxicants that are known to induce multiple organ damage, even at lower levels of exposure. According to the United States Environmental Protection Agency (U.S. EPA), and the International Agency for Research on Cancer (IARC), these metals are also classified as either “known” or “probable” human carcinogens based on epidemiological and experimental studies showing an association between exposure and cancer incidence in humans and animals.

Heavy metal-induced toxicity and carcinogenicity involves many mechanistic aspects, some of which are not clearly elucidated or understood. However, each metal is known to have unique features and physic-chemical properties that confer to its specific toxicological mechanisms of action. This review provides an analysis of the environmental occurrence, production and use, potential for human exposure, and molecular mechanisms of toxicity, genotoxicity, and carcinogenicity of arsenic, cadmium, chromium, lead, and mercury.



Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

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
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, 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. 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:
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. 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: 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:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly 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, acids, moisture.

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: 0.01 from ACGIH (TLV) [United States] [1995] 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: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (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.

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, acids, moisture.

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: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

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: 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: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 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 cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic 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: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

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):
R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

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, cancérogènes. 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 Indutrial 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 dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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Beryllium: the essentials

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Beryllium is a Group 2 (IIA) element. It is a metal and has a high melting point. At ordinary temperatures, beryllium resists oxidation in air. Beryllium compounds are very toxic. Its ability to scratch glass is probably due to the formation of a thin layer of the oxide. Aquamarine and emerald are precious forms of the mineral beryl, $[Be_3Al_2(SiO_3)_6]$.

Its chemistry is dominated by its tendency to lose an electron to form Be^{2+}. As this ion is so small it is highly polarising, to the extent that its compounds are rather covalent. Its small size means that its complexes tend to be tetrahedral rahter than octahedral.

- Name (../periodicity/name_english/): beryllium
- Symbol (../periodicity/name_english/): Be
- Atomic number (../periodicity/atomic_number/): 4
- Relative atomic mass (A_r) (../periodicity/atomic_weight/): 9.012182 (3)
- Standard state (../periodicity/standard_state/): solid at 298 K
- Colour (../periodicity/standard_state/): lead grey
- Classification (../periodicity/classification/): Metallic

- Group in periodic table (../periodicity/group_number/): 2
- Group name (../periodicity/group_number/): Alkaline earth metal
- Period in periodic table (../periodicity/group_number/): 2
- Block in periodic table (../periodicity/group_number/): s-block
- Electron shell structure (../periodicity/electron_shell_structure/): 2.2
- CAS Registry ID (../periodicity/cas_registry_id/): 7440-41-7

Beryllium: historical information

Beryllium was discovered (../periodicity/discovery/) by Nicholas Louis Vauquelin (1763-1829) in 1797 at France. Origin of name (../periodicity/discovery/): from the Greek word "*beryllos*" meaning "*beryl*".
Emeralds and beryl were both known to early Egyptians but it was not realised until the end of the 18th century that they are the same mineral, now called beryllium aluminium silicate: $[Be_3Al_2(SiO_3)_6]$. The element was recognised by M.-L. Vauquelin in 1798 in beryl and emeralds. The metal was isolated much later on in 1828 by Friederich Wöhler (and independently by A.-A.B. Bussy) by the action of potassium on $BeCl_2$ in a platinum crucible.

Beryllium around us Read more » (./geology.html)

Beryllium has no biological role. In fact, compounds containing beryllium are poisonous.

Beryllium is found in a number of minerals. The most important minerals are beryl, [$Be_3Al_2(SiO_3)_6$], which is often found as hexagonal prisms, and bertrandite [$4BeO.2SiO_2.H_2O$]. Aquamarine and emerald are precious forms of beryl.

Abundances for beryllium in a number of different environments. More abundance data » (./geology.html)

Location	ppb by weight	ppb by atoms	Links
Universe (../periodicity/abundance_universe/)	1	0.1	 (../periodicity/abundance_universe/)
Crustal rocks (../periodicity/abundance_crust/)	1900	4300	 (../periodicity/abundance_crust/)
Human (../periodicity/abundance_humans/)	0.4 ppb by weight	0.3 atoms relative to C = 1000000	 (../periodicity/abundance_humans/)

Physical properties Read more » (./physics.html)

 Density of solid (../periodicity/density/): 1848 kg m^{-3}

 Molar volume (../periodicity/molar_volume/): 4.85 cm^3

 Thermal conductivity (../periodicity/thermal_conductivity/): 190 W m^{-1} K^{-1}

Heat properties Read more » (./thermochemistry.html)

 Melting point (../periodicity/melting_point/): 1560 [1287 °C (2349 °F)] K

 Boiling point (../periodicity/boiling_point/): 2742 [2469 °C (4476 °F)] K

 Enthalpy of fusion (../periodicity/enthalpy_fusion/): 7.95 kJ mol^{-1}

Crystal structure Read more » (./crystal_structure.html)

The solid state structure of beryllium is: hcp (hexagonal close-packed).

Beryllium: orbital properties Read more » (./atoms.html)

Beryllium atoms have 4 electrons and the **shell structure (../periodicity/electron_shell_structure/)** is 2.2. The **ground state electronic configuration of neutral Beryllium is (../periodicity/electronic_configuration/)** [**He**].**2s**^{2} and the **term symbol of Beryllium (../periodicity/term_symbol/) is** $^1S_0$.


Pauling electronegativity (../periodicity/electronegativity_pauling/): 1.57 (Pauling units)


First ionisation energy (../periodicity/ionisation_energy_1/): 899.5 kJ mol^{-1}


Second ionisation energy (../periodicity/ionisation_energy_2/): 1757.1 kJ mol^{-1}

Isolation

Isolation (../periodicity/isolation/): beryllium metal is available commercially and so would never normally be made in the laboratory. Its extraction from ores is complex. The mineral beryl, [$Be_3Al_2(SiO_3)_6$] is the most important source of beryllium. It is roasted with sodimu hexafluorosilicate, Na_2SiF_6, at 700°C to form beryllium fluoride. This is water soluble and the beryllium may be precipitated as the hydroxide $Be(OH)_2$ by adjustment of the pH to 12.

Pure beryllium may be obtained by electrolysis of molten $BeCl_2$ containing some NaCl. The salt is added since the molten $BeCl_2$ conducts very poorly. Another method involves the reduction of beryllium fluoride with magnesium at 1300°C.

$$BeF_2 + Mg \rightarrow MgF_2 + Be$$

Beryllium isotopes Read more » (./isotopes.html)

Table. Stables isotopes of beryllium (../periodicity/isotopes/).

Isotope	Mass /Da	Natural abund. (atom %)	Nuclear spin (I)	Nuclear magnetic moment (μ/μ_N)
^{9}Be	9.012 182 1(4)	100	$^3/_2$	-1.1779

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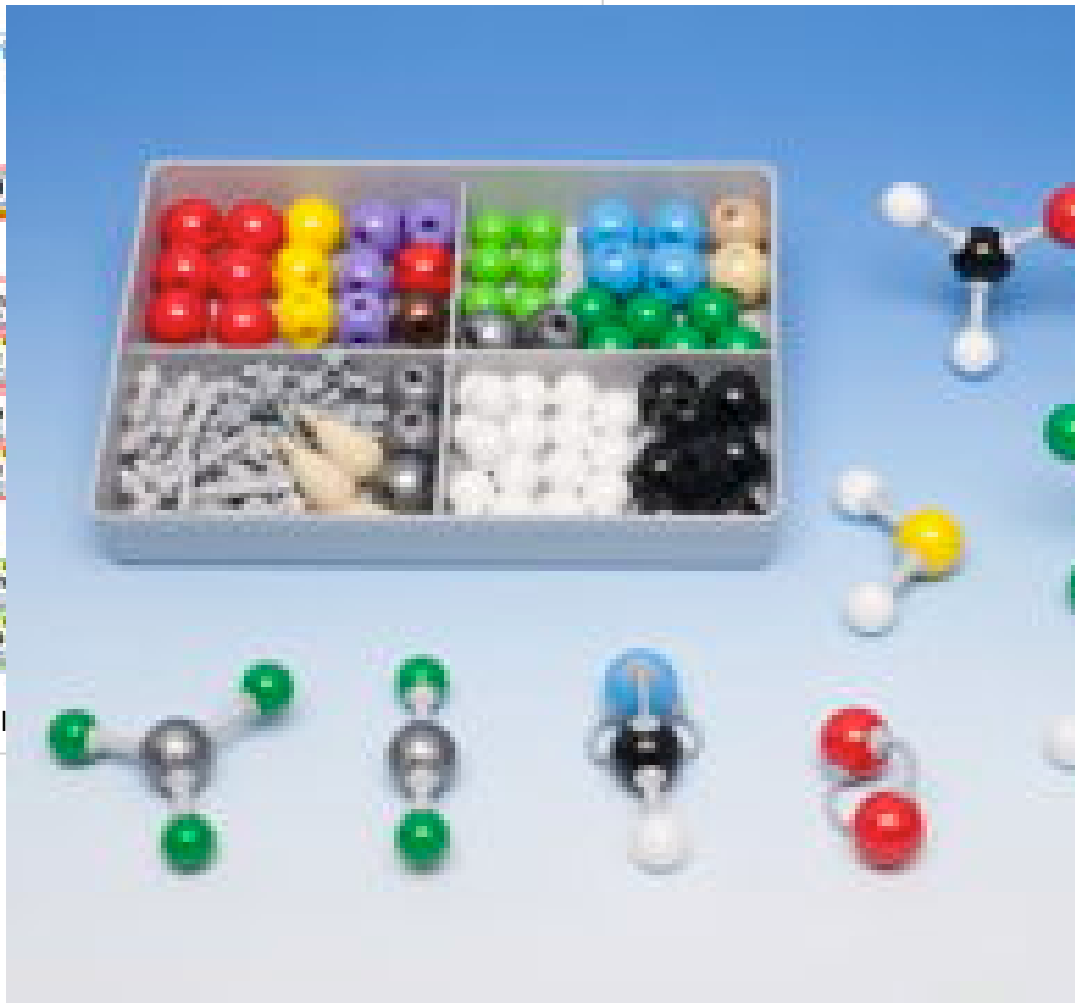

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H (../hydrogen/index.html)		
Li (../lithium/index.html)	Be	B (../boron/index.html)
Na (../sodium/index.html)	Mg (../magnesium/index.html)	Al (../aluminium/index.html)

Actinium (../actinium/)

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Aluminum (../aluminium/)

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Mercury (../mercury/)

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Moscovium (../moscovium/)

Neodymium (../neodymium/)

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Tin (../tin/)

Titanium (../titanium/)

Tungsten (../tungsten/)

Uranium (../uranium/)

Vanadium (../vanadium/)

Xenon (../xenon/)

Ytterbium (../ytterbium/)

Yttrium (../yttrium/)

Zinc (../zinc/)

Zirconium (../zirconium/)

4 Be

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Beryllium	Béryllium
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Beryllium	Berílio

Description

Beryllium

Key information

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List of properties (../beryllium/contents.html)

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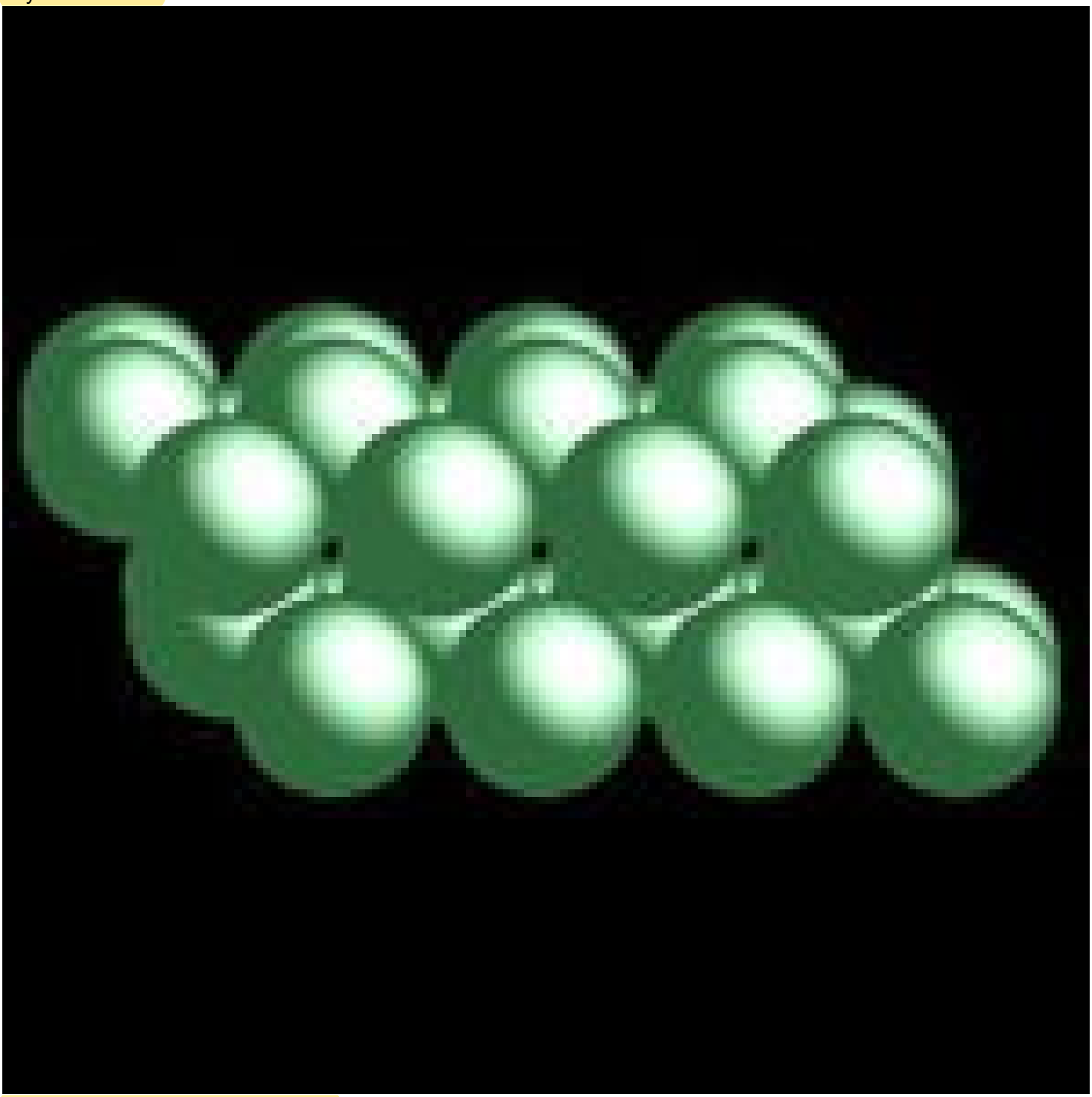
Element properties

Crystal structure



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Atom properties

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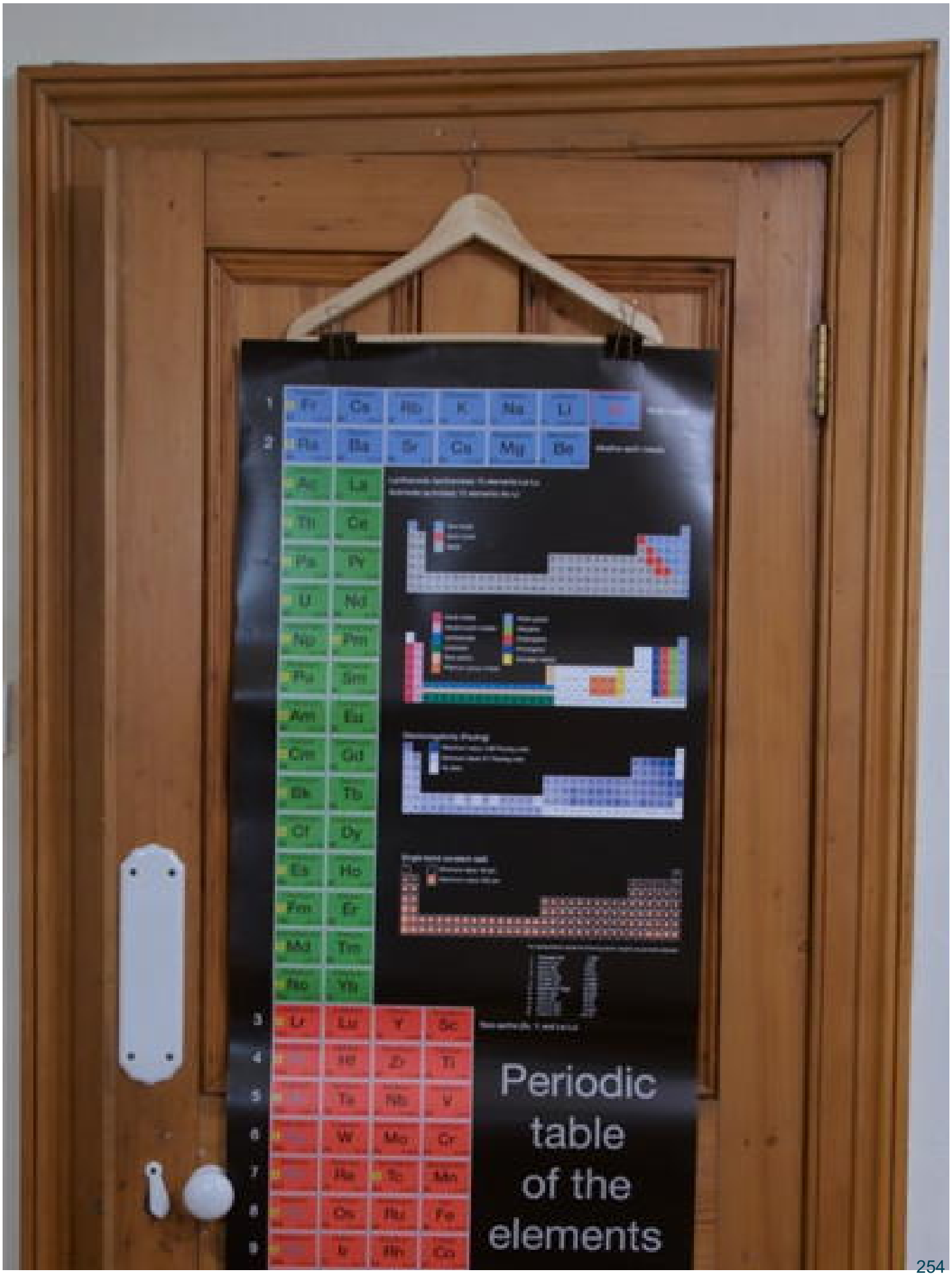
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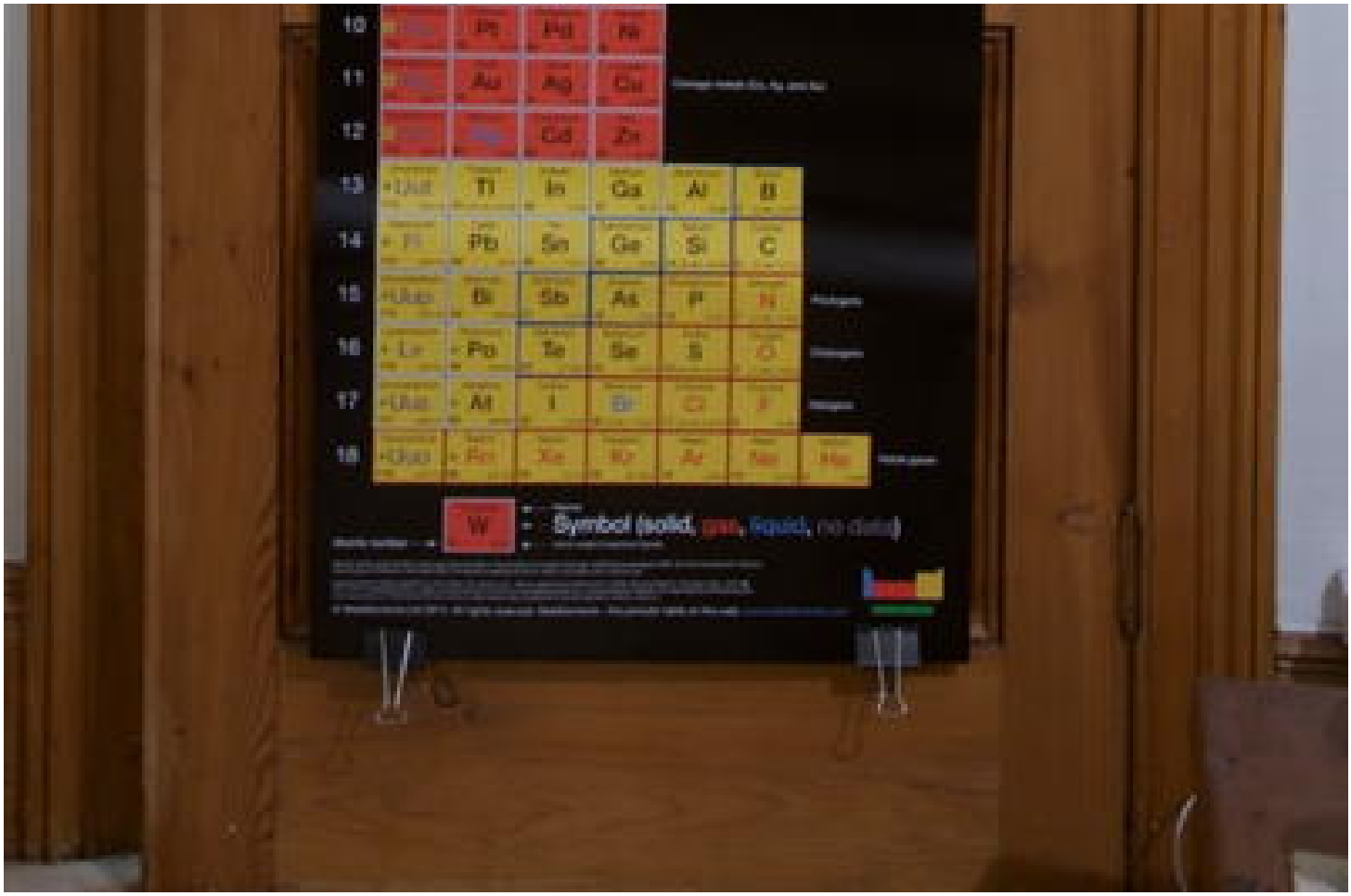

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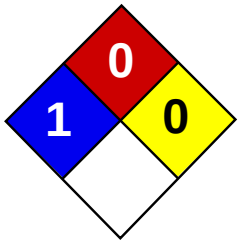

Material Safety Data Sheet
Lead MSDS

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 lungsby 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 abssorbed 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, deliriuim, 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 cholic), 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.

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Last Updated: 05/21/2013 12:00 PM

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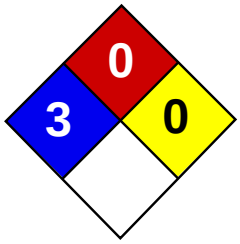

Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

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
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in 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:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) 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 blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. 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. WARM water MUST 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. 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: 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:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. 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. Do not ingest. Do not breathe gas/fumes/ vapor/spray. 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, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°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:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

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: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

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

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

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: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 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: Mercury 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: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 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 liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear 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. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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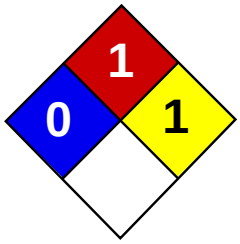

Health	1
Fire	1
Reactivity	1
Personal Protection	E

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 flamming decomposition occurs at temperatures a little above its melting point. Contact with acids and alkali hydroxides (sodium hydroxide, postasium 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, NH4NO3, barium oxide, Ba(NO3)2, Cadmium, CS2, chlorates, Cl2, CrO3, F2, Hydroxylamine, Pb(N3)2, MnCl2, HNO3, performic acid, KClO3, KNO3, N2O2, Selenium, NaClO3, Na2O2, Sulfur, Te, water, (NH4)2S, As2O3, CS2, CaCl2, chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl, H2SO4, (Mg +Ba(NO3)2 +BaO2), (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 harmul 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, dizzness, 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: 05/21/2013 12:00 PM

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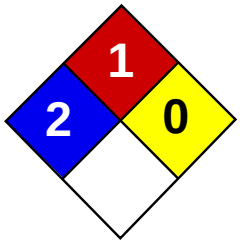

Material Safety Data Sheet
Copper MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper

Catalog Codes: SLC4939, SLC2152, SLC3943, SLC1150, SLC2941, SLC4729, SLC1936, SLC3727, SLC5515

CAS#: 7440-50-8

RTECS: GL5325000

TSCA: TSCA 8(b) inventory: Copper

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Cu

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
Copper	7440-50-8	100

Toxicological Data on Ingredients: Copper LD50: Not available. LC50: Not available.

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).

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, 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. 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: Not available.

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: 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: 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:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

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. 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. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible.

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. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

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: 1 (mg/m3) from ACGIH [1990] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 63.54 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2595°C (4703°F)

Melting Point: 1083°C (1981.4°F)

Critical Temperature: Not available.

Specific Gravity: 8.94 (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: 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: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

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 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: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Copper Massachusetts RTK: Copper TSCA 8(b) inventory: Copper CERCLA: Hazardous substances.: Copper

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

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. 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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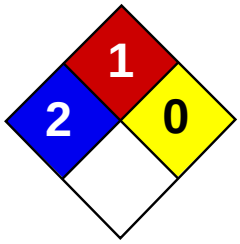

Health	2
Fire	1
Reactivity	0
Personal Protection	E

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) +/- !0 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, reddness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconoisis. 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.

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Last Updated: 05/21/2013 12:00 PM

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The MSDS Hyper Glossary

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Risk Phrases (R-phrases)

Definition

The European Union (EU) requires that **risk phrases (R-phrases)** appear on each label and safety data sheet for hazardous chemicals. R-phrases consist of the letter R followed by a number. The precise meaning of each of these appears in the table below.

Labels will also have symbols or pictograms (see CHIP), but the R-phrase specifies the *particular* danger(s). For example, sodium metal may have a large F and flame icon on the label, but the particular risk is denoted by R14/15 and R34 which correspond to "Reacts violently with water liberating highly flammable gases" and "causes burns".

Safety phrases (S-phrases) for handling precautions are also part of the same requirements.

Additional Info

Both risk and safety phrases are being phased out in favor of Hazard Statements and Precautionary Statements under the EU's implementation of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) per EU Regulation (EC) 1272/2008 (6.6 MB PDF file).

More than one R-phrase may appear on an MSDS. These are usually presented in combination, such as R36/37/38. In the first table below, single phrases are given, and in the second table, combinations are given. In general, no more than four R-phrases should be sufficient to adequately communicate the risks of a particular material. The R phrases selected should be those applicable to the substance(s) present in the concentration which gives rise to the most severe classification (for example, T+ versus T).

Conversions from R-statements to H-statements can be found starting on page 1352 of EU Regulation (EC) 1272/2008.

Single Risk Phrases	
R1	Explosive when dry.
R2	Risk of explosion by shock, friction, fire or other sources of ignition.

R3	Extreme risk of explosion by shock, friction, fire or other sources of ignition.
R4	Forms very sensitive explosive metallic compounds.
R5	Heating may cause an explosion.
R6	Explosive with or without contact with air.
R7	May cause fire.
R8	Contact with combustible material may cause fire.
R9	Explosive when mixed with combustible material.
R10	Flammable.
R11	Highly flammable.
R12	Extremely flammable.
R13	Extremely flammable liquified gas. This code is no longer in use.
R14	Reacts violently with water.
R15	Contact with water liberates highly flammable gases.
R16	Explosive when mixed with oxidizing substances.
R17	Spontaneously flammable in air.
R18	In use, may form flammable/explosive vapour-air mixture.
R19	May form explosive peroxides.
R20	Harmful by inhalation.
R21	Harmful in contact with skin.
R22	Harmful if swallowed.
R23	Toxic by inhalation.
R24	Toxic in contact with skin.
R25	Toxic if swallowed.
R26	Very toxic by inhalation.
R27	Very toxic in contact with skin.
R28	Very toxic if swallowed.
R29	Contact with water liberates toxic gases.
R30	Can become highly flammable in use.
R31	Contact with acids liberates toxic gas.
R32	Contact with acids liberates Very toxic gas.
R33	Danger of cumulative effects.
R34	Causes burns.
R35	Causes severe burns.
R36	Irritating to eyes.
R37	Irritating to respiratory system.
R38	Irritating to skin.
R39	Danger of very serious irreversible effects.
R40	Possible risks of irreversible effects.
R41	Risk of serious damage to eyes.

R42	May cause sensitization by inhalation.
R43	May cause sensitization by skin contact.
R44	Risk of explosion if heated under confinement.
R45	May cause cancer.
R46	May cause heritable genetic damage.
R47	May cause birth defects.
R48	Danger of serious damage to health by prolonged exposure.
R49	May cause cancer by inhalation.
R50	Very toxic to aquatic organisms.
R51	Toxic to aquatic organisms.
R52	Harmful to aquatic organisms.
R53	May cause long-term adverse effects in the aquatic environment.
R54	Toxic to flora.
R55	Toxic to fauna.
R56	Toxic to soil organisms.
R57	Toxic to bees.
R58	May cause long-term adverse effects in the environment.
R59	Dangerous for the ozone layer.
R60	May impair fertility.
R61	May cause harm to the unborn child.
R62	Possible risk of impaired fertility.
R63	Possible risk of harm to the unborn child.
R64	May cause harm to breastfed babies.

Multiple Risk Phrases	
R14/15	Reacts violently with water liberating highly flammable gases.
R15/29	Contact with water liberates toxic, highly flammable gas.
R20/21	Harmful by inhalation and in contact with skin.
R20/22	Harmful by inhalation and if swallowed.
R20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
R21/22	Harmful in contact with skin and if swallowed.
R23/24	Toxic by inhalation and in contact with skin.
R23/25	Toxic by inhalation and if swallowed.
R23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
R24/25	Toxic in contact with skin and if swallowed.
R26/27	Very toxic by inhalation and in contact with skin.
R26/28	Very toxic by inhalation and if swallowed.
R26/27/28	Very toxic by inhalation, in contact with skin and if swallowed.
R27/28	Very toxic in contact with skin and if swallowed.

R36/37	Irritating to eyes and respiratory system.
R36/38	Irritating to eyes and skin.
R36/37/38	Irritating to eyes, respiratory system and skin.
R37/38	Irritating to respiratory system and skin.
R39/23	Toxic: danger of very serious irreversible effects through inhalation.
R39/24	Toxic: danger of very serious irreversible effects in contact with skin.
R39/25	Toxic: danger of very serious irreversible effects if swallowed.
R39/23/24	Toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
R39/23/25	Toxic: danger of very serious irreversible effects through inhalation and if swallowed.
R39/24/25	Toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
R39/23/24/25	Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
R39/26	Very toxic: danger of very serious irreversible effects through inhalation.
R39/27	Very toxic: danger of very serious irreversible effects in contact with skin.
R39/28	Very toxic: danger of very serious irreversible effects if swallowed.
R39/26/27	Very toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
R39/26/28	Very toxic: danger of very serious irreversible effects through inhalation and if swallowed.
R39/27/28	Very toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
R39/26/27/28	Very toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
R40/20	Harmful: possible risk of irreversible effects through inhalation.
R40/21	Harmful: possible risk of irreversible effects in contact with skin.
R40/22	Harmful: possible risk of irreversible effects if swallowed.
R40/20/21	Harmful: possible risk of irreversible effects through inhalation and in contact with skin.
R40/20/22	Harmful: possible risk of irreversible effects through inhalation and if swallowed.
R40/21/22	Harmful: possible risk of irreversible effects in contact with skin and if swallowed.
R40/20/21/22	Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R48/21	Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.

R48/20/21	Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
R48/20/22	Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/21/22	Harmful: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
R48/20/21/22	Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
R48/24	Toxic: danger of serious damage to health by prolonged exposure in contact with skin.
R48/25	Toxic: danger of serious damage to health by prolonged exposure if swallowed.
R48/23/24	Toxic: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
R48/23/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/24/25	Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
R48/23/24/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

MSDS Relevance

Risk phrases are not required on labels or MSDS's by U.S. OSHA, however, they are required in the European Community. Therefore, you may see these R phrases on your sheets, especially as manufacturers start following internationally-accepted formats such as the ANSI system. Or you may start seeing H-statements instead of risk phrases as the GHS is phased in.

Remember that risk phrases indicate only the risk of a material, not the safety precautions that you need to follow. For safety information see the safety phrases entry.

Gas cylinder tags and all kind of workplace accessories are available at Safety Emporium

Further Reading

- The Basics of Chemical Safety at the International Occupational Safety and Health Information Centre (CIS) discusses R- and S-phrases, and includes a list of chemicals.
- A R- and S-phrases language conversion tool in 23 languages at SchoolScout24.
- Council Directive 2006/102/EC (PDF file) contains R- and S-phrases as well as other hazard terms in 23 languages.

- The Provisions for Classifying Dangerous Preparations (see Schedule 3) discusses how risks and risk phrases are quantified.

See also: ANSI, CHIP, EINECS, Hazard Statements, safety phrases and the International Section of the MSDS FAQ.

Additional definitions from Google and OneLook.

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Abbreviations from *Instant Tox-Base*

ACGIH - American Conference of Governmental Industrial Hygeniests

AChE - acetylcholinesterase

Action Level - the exposure concentration at which certain provisions of the NIOSH recommended standard must be initiated.

ADI - acceptable daily intake

AIHA - American Industrial Hygiene Associaton

ASTM - American Society for Testing and Materials

brd - domestic or laboratory bird

Bw - body weight

bwd - wild bird species

Ca- potential human carcinogen

CAS - Chemical Abstract Service

CASRN - Chemical Abstract Service Registery Number

cat - adult cat

cc - cubic centimeter

CCINFO - Canadian Centre for Occupational Health and Safety, Toronto, Canada

CDC - Center for Disease Control (in Atlanta, Georgia)

CFR - Code of Federal Regulations

chd - child

Che - cholinesterase

CIB - NIOSH Current Intelligence Bulletin

CIS - Fein-Marquardt and Co., Chemical Information System

ckn - chicken, adult (male or female)

CL - ceiling limit - the concentration that should not be exceeded even instantaneously.

Clear Evidence - when carcinogenicity is demonstrated by studies that are interpreted as showing a chemically related increased incidence of malignant neoplasms, studies that exhibit a substantially increased incidence of benign neoplasms, or studies that exhibit an increased incidence of a combination of malignant and benign neoplasms where each increases with dose.

CODEN - a unique six-letter character code derived from the American Society for Testing and Materials CODEN for Periodical Titles and the CAS Source Index.

ctl - cattle or horse

dBA - decibel, weighted according to the A scale, which approximates the response of the human ear.

dck - duck

DEA - US Drug Enforcement Administration

dog - adult dog

dom - domestic animals such as goat or sheep

DOT - US Department of Transportation

ECG - electrocardiogram

EPA -- US Environmental Protection Agency

Equivocal Evidence - when carcinogenicity is demonstrated by studies that are interpreted as showing a chemically related marginal increase of neoplasms.

fbr - fiber

FR - Federal Register

frg - adult frog

GC - gas chromatography (a technique used to separate mixtures of volatile chemicals from each other)

GI - gastrointestional

gpg - guinea pig

grb - gerbil

ham - hamster

HDT - highest dose tested

HEC - human equivalent concentration

hmn - human

hor - horse or donkey

HPLC - high performance liquid chromatography (a technique used to separate mixtures of nonvolatile chemicals from each other)

HSDB - Hazardous Substances Data Bank

ial - intraaural (ear)

IARC - United Nations International Agency for Research on Cancer.

iat - intraarterial (artery)

ice - intracerebral (cerebrum)

ICR - Institute of Cancer Research

icv - intracervical (cervix)

idr - intradermal (dermis (skin))

idu - intraduodenal (duodenum)

ihl - inhalation (route of exposure used for a chemical)

IMO - International Maritime Organization

imp - surgical implant

ims - intramuscular (muscle)

Inadequate Evidence - when, because of major qualitative or quantitative limitatons, the studies cannot be interpreted as showing eiher the presence or absence of a carcinogenic effect. This indicates that one of two conditions prevailed: (a) there are few pertinent data; or (b) the available studies, while showing evidence of association, do not exclude chance, bias, or confounding.

Inadequate Study - when carcinogenicity is not demonstrated because of major qualitative or quantitative limitations, and the studies cannot be interpreted as valid for showing either the presence or absence of a carcinogenic effect.

inf - human infant

ipc - intraplacental (placenta)

ipl - intrapleural (pleural cavity)

ipr - intraperitoneal (peritoneal cavity)

IRIS - Integrated Risk Information System (Instant EPAs IRIS is one of the publications from Instant Reference Sources, Inc. that is hyperlinked to this publication)

irn - intrarenal (kidney)

isp - intraspinal (spinal canal)

itr - intratracheal (trachea)

itt - intratesticular (testes)

iut - intrauterine (uterus)

ivg - intravaginal (vagina)

ivn - intravenous (vein)

kdy - kidney

kg - killigram (one thousand grams)

L - liter (one thousand milliliters)

LC - lethal concentration

LC50 - Lethal Concentration 50 - a calculated concentration of a substance in air, exposure to which for a specified length of time, is expected to cause the death of 50% of an entire defined experimental population. It is determined from the exposure to the substance of a significant number from that population.

LCLo - Lethal Concentration Low - the lowest concentration of a substance in air, other than LC50, which has been reported to have caused death in humans or animals. The reported concentrations may be entered for periods of exposure which are less than 24 hours (acute) or greater than 24 hours (subacute and chronic).

LD - lethal dose

LD50 - Lethal Dose 50 - a calculated dose of a substance which is expected to cause the death of 50% of an experimental animal population. It is determined from the exposure to the substance by any route other than inhalation of a significant number from that population.

LDLo - Lethal Dose Low - the lowest dose (lower than LD50) of a substance introduced by any route, other than inhalation, over any given period of time, in one or more divided portions and reported to have caused death in humans or animals.

LDT - lowest dose tested

leu - leukemia

Limited Evidence - evidence of carcinogenicity when data suggest a carcinogenic effect but are limited because: (a) the studies involve a single species, strain or experiment; or (b) the experiments are restricted by inadequate dosage levels, inadequate duration of exposure to the agent, inadequate duration of exposure to the agent, inadequate period of follow-up, poor survival, too few animals, or inadequate reporting; or (c) the neoplasms produced often occur spontaneously and, in the past, have been difficult to classify as malignant by histological criteria alone. This indicates that a causal interpretation is credible, but that alternative explanations, such as chance, bias, or confounding, could not adequately be excluded.

LOAEL - lowest observed adverse effect level

lym - lymphatic (pertaining to lymph glands, cells or the lymphatic system)

mam - mammal of an unidentified species

man - adult man

MEV - minimum effective dose

mg - milligram

mky - monkey

MLD - mild - a well defined erythema and slight edema on the skin where the dose was applied.

mmol - millimole

MOD - moderate - moderate to severe erythema and severe edema on the skin where the dose was applied resulting in a raised area of about 1 mm.

MOE - margin of exposure

MSHA - Mine Safety and Health Administration

MTD - maximum tolerated dose

MTL - median threshold limit

mul - multiple

mus - mouse

NCI - National Cancer Institute

ng - nanogram

NIH - National Institues of Health

NIOSH - National Institute of Occupational Safety and Health

NLM - National Library of Medicine

nml - non-mammalian species

nmol - nanomole

No Evidence - when several adequate studies are available which show that, within the limits of the tests used, the chemical is not carcinogenic.

NOEL - no observed effect level

NRC - National Research Council

nse - non-standard exposure (for example, a spill or accidental exposure)

NTIS - National Technical Informational System

NTP - National Toxicology Program

ocu - ocular (eye)

ORD - US EPA Office of Research and Development

orl - oral (through the mouth via feeding or drinking)

oth - other (?)

otr - other (?)

OTS - US EPA Office of Toxic Substances

par - parenteral (skin)

PCB - polychlorinated biphenyls

PEL - OSHA permissible exposure level

pg - picogram

pgn - pigeon

pig - adult pig

pmol - picomole

ppb - parts per billion

pph - parts per hundred

ppm - parts per million

ppt - parts per trillion

qal - laboratory quail

rat - adult male, adult female or unspecified sex of rat

rbt - adult rabbit

rec - rectal (rectum or colon)

REL - NIOSH recommended exposure limi

rns - rinsed

RTECS - Registry of Toxic Effects of Chemical Substances

RV - residual volume

sat - saturated

scu - subcutaneous (under the skin)

SEV - severe - severe erythema (beet redness) to slight eschar formation (injuries in depth) and severe edema (raised more than 1 mm and extending beyond area of exposure) on the skin where the dose was applied.

(skin) - potential contribution to overall exposure by the cutaneous route including mucous membranes and eyes.

skn - skin

SMR - standard mortality rate

Some Evidence - when carcinogenicity is demonstrated by studies that are interpreted as showing a chemically related increased incidence of benign neoplasms, studies that exhibit marginal increases in neoplasms of several organs/tissues, or studies that exhibit a slight increase in uncommon malignant or benign neoplasms.

specie - species of animal tested (e.g., rat, rabbit, human, etc.)

sql - squirrel

STEL - short term exposure limit

Sufficient Evidence - evidence of carcinogenicity when there is an increased incidence of malignant tumors: (a) in multiple species or strains; or (b) in multiple experiments (preferably with different routes of administration or using different dose levels); or (c) to an unusual degree with regard to incidence, site or type of tumor, or age at onset. Additional evidence may be provided by data on dose-response effects. This indicates that there is a causal relationship between the exposure and human cancer.

TC - toxic concentration

TCLo - Toxic Concentration Low - the lowest concentration of substance in air to which humans or animals have been exposed for any given period of time, that has produced any toxic effect in humans, or has produced a tumorigenic or reproductive effect in animals or humans.

TD - toxic dose

TDLo - Toxic Dose Low - the lowest dose of a substance introduced by any route other than inhalation, over any given period of time, to which humans or animals have been exposed and reported to produce any non-significant toxic effects in humans or to produce non-significant tumorigenic or reproductive effects in animals or humans.

TEC - Toxic Effects Code

TLV - Threshold Limit Values - recommended limits proposed by the American Conference of Governmental Industrial Hygienists (ACGIH) to which most workers can be exposed wihout adverse effect. TLVs may be expressed as a time-weighted average (TWA), as a short term exposure limit (STEL), or as a ceiling value (CL).

tod - toad

TOXNET - Toxicology Data Network

trk - turkey

TSCA - Toxic Substances Control Act

TSCATS - Toxic Substance Control Act Test Submission

TWA - time-weighted average

ug - microgram

umol - micromole

unr - unreported

WHO - United Nations World Health Organization.

wmn - woman

Appendix C

Heat and Cold Stress Guidelines

Heat Stress Guidelines

Form	Signs & Symptoms	Care	Prevention[3]
Heat Rash	Tiny red vesicles in affected skin area. If the area is extensive, sweating can be impaired.	Apply mild lotions and cleanse the affected area.	Cool resting and sleeping areas to permit skin to dry between heat exposures.
Heat Cramps	Spasm, muscular pain (cramps) in stomach area and extremities (arms and legs).	Provide replacement fluids with minerals (salt) such as Gatorade.	Adequate salt intake with meals[1]. ACCLIMATIZATION[2]
Heat Exhaustion	Profuse sweating, cool (clammy) moist skin, dizziness, confusion, pale skin color, faint, rapid shallow breathing, headache, weakness, and/or muscle cramps.	Remove from heat, sit or lie down, rest, replace lost water with electrolyte replacement fluids (water, Gatorade) take frequent sips of liquids in amounts greater than required to satisfy thirst.	ACCLIMATIZATION[2] Adequate salt intake with meals[1], only during early part of heat season. Ample water intake, frequently during the day.
Heat Stroke	HOT Dry Skin. Sweating has stopped. Mental confusion, dizziness, nausea, chills, severe headache, collapse, delirium, and/or coma.	HEAT STROKE IS A MEDICAL EMERGENCY • Remove from heat. • COOL THE BODY AS RAPIDLY AS POSSIBLE by immersing in cold (or cool) water, or splash with water and fan. • Call for Emergency Assistance. • Observe for signs of shock.	ACCLIMATIZATION[2] Initially moderate workload in heat (8 to 14 days). Monitor worker's activities.

Footnotes:

1.) American diets are normally high in salt, sufficient to aid acclimatization. However, during the early part of the heat season, (May, June), one extra shake of salt during one to two meals per day may help, so long as this is permitted by your physician. Check with your personal physician.

2.) ACCLIMATIZATION - The process of adapting to heat is indicated by worker's ability to perform hot jobs less fluid loss, lower concentrations of salt loss in sweat, and a reduced core (body) temperature and heart rate.

3.) Method to Achieve Acclimatization - Moderate work or exercise in hot temperatures during early part of heat season. Adequate salt (mineral) and water intake. Gradually increasing work time in hot temperatures. Avoid alcohol. Normally takes 8 to 14 days to achieve acclimatization. Lost rapidly, if removed from strenuous work (or exercise) in hot temperature for more than approximately 5 days.

Cold Stress Guidelines

Stress	Symptoms	What to do
Mild Hypothermia	• Body Temp 98 to 90°F • Shivering • Lack of coordination, stumbling, fumbling hands • Slurred speech • Memory loss • Pale, cold skin	• Move to warm area • Stay active • Remove wet clothes and replace with dry clothes or blankets • Cover the head • Drink warm (not hot) sugary drink
Moderate Hypothermia	• Body temp 90 to 86°F • Shivering stops • Unable to walk or stand • Confused and/or irrational	• All of the above, plus: o Call 911 o Cover all extremities completely o Place very warm objects, such as hot packs on the victim's head, neck, chest, and groin
Severe Hypothermia	• Body temp 86 to 78°F • Severe muscle stiffness • Very sleepy or unconscious • Ice cold skin • Death	• Call 911 • Treat victim very gently • Do not attempt to re-warm
Frostbite	• Cold, tingling, stinging, or aching feeling in the frostbitten area, followed by numbness • Skin color turns red, then purple, then white or very pale skin • Cold to the touch • Blisters in severe cases	• Call 911 • Do not rub the area • Wrap in soft cloth • If help is delayed, immerse in warm (not hot) water
Trench Foot	• Tingling, itching, or burning sensation • Blisters	• Soak feet in warm water, then wrap with dry cloth bandages • Drink a warm (not hot) sugary drink

Appendix D

Forms

GEI Consultants

Accident/Incident Report Form

Please complete this form and send it to your Branch Manager, HR and CHSO ***within 24 hours*** of the incident.

SECTION A — ACCIDENT/INCIDENT DETAILS

EMPLOYEE INFORMATION:

Name: _____

Home Address: _____
Street Address City State Zip Code

Contact Information: ( ) _____ ( ) _____
Primary Secondary

Date of Birth: _____

Date of Hire: _____

Branch: _____

Supervisor: _____

OTHER INJURED (IF APPLICABLE):

Name: _____

Home Address: _____
Street Address City State Zip Code

Contact Information: ( ) _____ ( ) _____
Primary Secondary

Date of Birth: _____

Date of Hire: _____

Branch: _____

Supervisor: _____

Date and Time Accident/Incident	Date and Time Reported
____ /____ /____ Month Day Year	____ /____ /____ Month Day Year
____ A.M. ____ P.M.	____ A.M. ____ P.M.

LOCATION OF INCIDENT/ACCIDENT

Project Name: _____

Client and Location: _____

or _____

Office Location: _____

INCIDENT TYPE: (Check All That Applies)

- ☐ **Personal Injury/Illness**
- ☐ **Vehicle Accident**
- ☐ **Property Damage**
- ☐ **Environmental Spill**
- ☐ **Other**

WITNESS INFORMATION

Name: _____

Contact Number: _____

Company: _____

WHAT HAPPENED TO THE INJURED PARTY: ☐First Aid Administered ☐Refused Treatment/Transport ☐Transported to Hospital ☐Returned to Work ☐ Went Home ☐ Went to Physician ☐ Unknown

Clinic/Hospital or Treating Physician: _____ Phone: _____
Name Street Address City State Zip Code

SECTION B — PERSONAL INJURY

Cause of Injury: _____

Part of Body Injured: _____ Multiple Injuries: ☐Y ☐N

Was PPE worn when injured? : ☐Y ☐N What PPE was worn? _____

WAS INJURY A RESULT OF THE USE A MOTOR VEHICLE: ☐ **YES** ☐ **NO** **(If yes, complete Section C)**

GEI Consultants

Accident/Incident Report Form

Please complete this form and send it to your Branch Manager, HR and CHSO ***within 24 hours*** of the incident.

SECTION C — AUTO ACCIDENT ONLY

DRIVER/VEHICLE INFORMATION

Name of Insured: _____

Department: _____

Driver's License Number: _____

DOB: ____/____/____ State: _____

Description of Vehicle: License Plate Number: _____

Make: _____ Model: _____ Year:_____ Color:_____

Owner: _____

Name of Other Driver: _____

Driver's License Number: _____

State: _____

Description of Vehicle: License Plate Number: _____

Make: _____ Model:_____ Year:_____ Color:_____

Insurance Carrier: _____

Policy Number: _____Ph. Number:_____

SECTION D — PROPERTY DAMAGE OR CHEMICAL RELEASE ONLY

Type of Damage(s): _____

Cause of Damage(s): _____

Type of Chemical Released (if known): _____

Quantity of Chemical Released: _____

Spill Measures Employed: _____

SECTION E — NATURE OF ACCIDENT/INCIDENT AND EXTENT OF INJURIES/DAMAGES

(Please give a detailed description of what happened. Attach a sketch or picture if applicable)

_____

_____

_____

_____

_____

_____

_____

_____

_____

I hereby certify that the above information is true and correct to my understanding of this accident/incident.

_____ _____

Employee/Preparer's Name **Date and Time**

GEI Consultants

Near Miss Report Form

Please complete this form and send it to your Branch Manager, HR and the Safety Team ***within 24 hours*** of the near miss.

NEAR MISS DETAILS

Employee Name: _____

Phone Number: _____

Branch: _____

Supervisor: _____

Date and Time Accident/Incident	Date and Time Reported	LOCATION OF NEAR MISS
____/____/____ Month Day Year ____A.M. ____P.M.	____/____/____ Month Day Year ____A.M. ____P.M.	**Project Name:** _____ **Client and Location:** _____ **or** _____ **Office Location:** _____

WHAT HAPPENED?

(Please give a detailed description of what happened. Attach photos or a sketch, if applicable.)

☐ **Photos were Taken**

WHAT WAS DONE?

(Please give a detailed description of what was done to prevent and incident from occurring.)

☐ **I have verbally contacted a member of the Safety Team and my Supervisor.**

Employee/Preparer's Name _____ **Date and Time** _____

GEI Consultants

Project Safety Briefing Form

Project Number:	**Project Name:**
Date:	**Time:**
Briefing Conducted by:	**Signature:**

This sign-in log documents that a project specific-briefing was conducted in accordance with the site-specific HASP and GEI's H&S policy. GEI personnel who perform work on site are required to attend this project briefing. Applicable health and safety SOPs and any additional hazards are also required to be reviewed during this briefing. Prior to the start of the project or upon the start of a new on-site project team member, this form must be completed. Please email this completed form to:

SafetyTeam@geiconsultants.com

TOPICS COVERED (check all those covered):

SOP HS-001 Biological Hazards		SOP HS-025 Manual Lifting	
SOP HS-002 Bloodborne Pathogens		SOP HS -26 Hazard Identification	
SOP HS-003 Container Management		SOP HS-27 Confined Space Entry for Sanitary Sewers	
SOP HS-004 Driver Safety		SOP HS-28 Safe Trailer Use	
SOP HS-005a Electrical Safety		SOP HS-29 Overtime and Fatigue Management	
SOP HS-005b Lockout/Tagout		Accident Reporting Procedures	
SOP HS-006 Excavation/Trenching		Changes to the HASP	
SOP HS-008a Hand Tools (Non-Powered)		Cold Stress	
SOP HS-008b Powered Hand Tools		Confined Space	
SOP HS-009 Hazardous Substances Management		Decon Procedures	
SOP HS-010 Inclement Weather		Exposure Guidelines	
SOP HS-011 Ladders		General PPE Usage	
SOP HS-012 Noise Exposure		Heat Stress	
SOP HS-013 Nuclear Density Gauge		Hearing Conservation	
SOP HS-014 Utility Markout		Lockout/Tagout	
SOP HS-015 Respirator Fit Test		Personal Hygiene	
SOP HS-016 Traffic Hazards		Respiratory Protection	
SOP HS-017 Water Safety		Review of Hazard Evaluation	
SOP HS-018 Working Around Heavy Equipment		Site Control	
SOP HS-019 Rail Safety		Site Emergency Procedures	
SOP HS-020 Aerial Lift		Slips, Trips, Falls	
SOP HS-021 Mobile Equipment		Other (Specify):	
SOP HS-022 Aquatic Ecological Survey/Electrofishing		Other (Specify):	
SOP HS-023 Scaffolding		Other (Specify):	
SOP HS-024 Wilderness Safety		Other (Specify):	

Personnel Sign-in List

Printed Name	**Signature**

Daily Safety Briefing and Site Visitor Sign-In

Project Number:	**Project Name:**
[1]Date:	**Time:**
Briefing Conducted by:	**Signature:**

This sign-in log documents the tailgate briefing conducted in accordance with the site specific HASP. Personnel who perform work operations on site are required to attend each briefing and to acknowledge receipt of each briefing, daily.

TOPICS COVERED (check all those covered):

☐ Accident Reporting Procedures	☐ Heat Stress	☐ Site Emergency Procedures	☐ Other:
☐ Changes to the HASP	☐ Hearing Conservation	☐ Slips, Trips, Falls	☐ Other:
☐ Cold Stress	☐ Lockout/Tagout	☐ Traffic Safety	☐ Other:
☐ Confined Space	☐ Personal Hygiene	☐ Other:	☐ Other:
☐ Decon Procedures	☐ Respiratory Protection	☐ Other:	☐ Other:
☐ Exposure Guidelines	☐ Review of Hazards	☐ Other:	☐ Other:
☐ General PPE Usage	☐ Site Control	☐ Other:	☐ Other:

Daily Safety Topic Description:

Personnel Sign-in List

Printed Name	Signature	Company Name	Time-In	Time-Out

[1] This form is applicable for *only* 1 day of site activity.

Appendix E

GEI Health and Safety SOPs

STANDARD OPERATING PROCEDURES

SOP No. HS-001 Biological Hazards

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the potential for GEI personnel to encounter biological hazards during field activities.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with biological hazards such as animals, insects, plants, and sewage. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with biological hazards and the control methods to be implemented by GEI employees. These hazards must be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Mammals

During some site operations, animals such as stray or domesticated dogs or cats, raccoons, snakes, bears, rats, bats, etc. may be encountered. Employees should use discretion and attempt to avoid contact with animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

1.3.1 Rabies

The rabies virus is transmitted through the bite of an infected animal or contact with saliva or brain/nervous system tissue of an infected animal. The rabies virus infects the central nervous system, causing disease in the brain. The early symptoms of rabies in people are fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

If you are bitten or think you may be exposed, wash any wounds immediately and thoroughly with soap and water. Then go to the hospital emergency room and notify the Project Manager and the People Safety Team. The doctor, possibly in consultation with the state or local health department, will decide if you need a rabies vaccination. Decisions to start series of vaccinations will be based on your type of exposure and the animal you were exposed to, as well as laboratory and surveillance information for the geographic area where the exposure occurred. If possible have someone document what type of animal it was, how it was behaving prior to the bite, what caused it to bite the

employee, and if it's not a domestic animal that would be easy to find again in the future, try to get animal control on site to capture it. An Incident Report Form must be completed and submitted, per GEI's Incident reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

1.4 Insects and Arachnids

Insects, including bees, wasps, hornets, mosquitoes, ticks, spiders, etc., may be present at a job site making the chance of a bite/sting possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life-threatening condition. Some insect bites can transmit diseases such as Lyme disease or a virus such as West Nile. The following is a list of preventive measures:

- Apply insect repellent prior to performing field work and as often as needed throughout the work shift.
- Wear proper personal protective equipment (PPE), including protective clothing (work boots, socks, and light colored clothing).
- Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk).
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- Field personnel who have or may have insect allergies must have insect allergy medication onsite and must inform the Site Safety Officer (SSO) and the People and Safety Team of their particular allergy prior to commencing work.
- Field personnel should perform a self-check at the end of the day for ticks.

1.4.1 Tick-borne Diseases

Lyme Disease

Lyme disease is caused by infection from a deer tick that carries a spirochete (a bacterium). During the painless tick bite, the spirochete may be transmitted into the bloodstream, often after feeding on the host for 12 to 24 hours. The ticks that cause the disease are often no bigger than a poppy seed or a comma in newsprint. The peak months for human infection are from May to September.

Symptoms appear in three stages. First symptoms usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick was attached. The rash is often bulls-eye like with red around the edges and clear in the center. The rash may be warm, itchy, tender, and/or "doughy." This rash appears in only 60 to 80 percent of infected persons. An infected

person also has flu-like symptoms of a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. These symptoms often disappear after a few weeks.

The second stage symptoms, which occur weeks to months later include meningitis, severe headache, drooping of the muscles on the face, called Bell's Palsy, encephalitis, numbness, withdrawal, and lethargy. These symptoms may last for several weeks to several months. Third stage symptoms, which occur months or years later include arthritis, heart problems, and loss of memory. The third stage symptoms may mimic multiple sclerosis and Alzheimer's disease.

When in areas that could harbor deer ticks, employees should wear light color clothing, and visually check themselves and check and be checked by another employee when coming from wooded or vegetated areas. If a GEI employee has a tick bite, the People and Safety Team and Project Manager must be contacted immediately. The employee will be offered the option for medical treatment by a physician, which typically involves antibiotics. An Incident Report form must be completed in compliance with the Incident Reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

If personnel feel sick or have signs similar to those mentioned above, the SSO and the People and Safety Team must be notified immediately.

Figure 1: From left to right, the deer tick adult female, adult male, nymph, and larva on a centimeter scale.

How to Remove a Tick

A tick can be removed from the skin by pulling gently at the head with tweezers. If tweezers are not available, use tissue paper or cloth to grasp the tick. It is important to grasp the tick as close to the site of attachment and use a firm steady pull to remove it. Wash hands immediately after with soap and water. The affected area should also be washed with soap and water, then disinfected with an antiseptic wipe, if available. All mouth parts must be removed from the skin. If the tick was removed by breaking off the

mouth parts, an irritation or infection may occur because the organism that is causing the disease can still enter the body through the skin.

Treatment for Lyme Disease

Treatment with antibiotics is effective and recovery is usually complete. For first stage symptoms, antibiotics are usually given orally. However, treatment for second and third stage symptoms is prolonged and recovery may take longer. Antibiotic treatment is usually provided intravenously for second and third stage Lyme disease.

Babesiosis

The deer tick can also cause Babesiosis, an infection of the parasite Babesia Microti. Symptoms of Baesiosis may not be evident, but may also include fever, fatigue and hemolytic anemia lasting from several days to several months. Babesiosis is most commonly diagnosed in the elderly or in individuals whose immune systems are compromised. If there are no signs or symptoms of Babesiosis, usually no treatment it needed. If an employee believes they might have Babesiosis they'll see a physician to be tested. Treatment usually consists of taking prescription medications for 7 to 10 days.

Ehrlichiosis

Ehrlichiosis is a tick-borne disease which can be caused by either of two different organisms. Human monocytic ehrlichiosis (HME) is caused by *Ehrlichia chaffeensis*, which is transmitted by the lone star tick (*Amblyomma americanum*). Human granulocytic anaplasmosis (HGA), previously known as human granulocytic ehrlichiosis (HGE), is caused by *Anaplasma phagocytophilia*, which is transmitted by the deer tick (*Ixodes scapularis*).

Ehrlichiosis is transmitted by the bite of infected ticks, including the deer tick and the lone star tick. The symptoms of HME and HGE are the same and usually include fever, muscle aches, weakness and headache. Patients may also experience confusion, nausea, vomiting and joint pain. Unlike Lyme disease or Rocky Mountain spotted fever, a rash is not common. Infection usually produces mild to moderately severe illness, with high fever and headache, but may occasionally be life-threatening or even fatal. Symptoms appear 1 to 3 weeks after the bite of an infected tick. However, not every exposure results in infection. For those that become infected a drug called Doxcycline will be prescribed.

Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is a tick-borne disease caused by a rickettsia (a microbe that differs somewhat from bacteria and virus). In the eastern United States, children are infected most frequently, while in the western United States, disease incidence is highest among adult males. Disease incidence is directly related to exposure to tick-infested habitats or to infested pets. Rocky Mountain spotted fever is characterized by a sudden onset of moderate to high fever (which can last for 2-3 weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash begins on the legs or arms, may include the

soles of the feet or palms of the hands and may spread rapidly to the trunk or rest of the body. Symptoms usually appear within 2 weeks of the bite of an infected tick. Like Ehrlichiosis the prescription drug Doxcycline is the first line treatment option.

1.4.2 Mosquito-Borne Disease

West Nile Virus

West Nile Virus is a mosquito-borne infection transmitted through the bite of an infected mosquito. The symptoms of West Nile Virus can be asymptomatic (no symptoms) or in more serious cases can lead to West Nile Fever. West Nile Fever can include fever, headache, tiredness, body ache, an occasional rash on the trunk of the body, and swollen lymph glands, In severe cases, people have developed West Nile Encephalitis or Meningitis which symptoms include fever, headache, neck stiffness, tremors, coma, and in some cases death. The incubation period for the disease is usually 2 to 15 days. The symptoms can range from a few days to several weeks. Most mosquitoes are not infected and the chance of infection from a mosquito bite of an on-site employee is very small.

1.5 Repellants

The following precautions will be used to help reduce the risk of mosquito bites:

Reduce mosquito-breeding areas by making sure wheelbarrows, buckets, and other containers are turned upside down when not used so that they do not collect standing water. According to the Environmental Protection Agency (EPA), many mosquitoes can breed in pooled water that's minimal enough to fill a bottle cap.

Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many mosquitoes are most active (between dawn and dusk).

Use mosquito repellant according to the manufacturer's directions when outdoors for long periods of time and when mosquitoes are most active.

Centers for Disease Control and Prevention (CDC) evaluation of information contained in peer-reviewed scientific literature and data available from the EPA has identified several EPA-registered products that provide repellent activity sufficient to help people avoid the bites of disease carrying mosquitoes. Products containing these active ingredients typically provide reasonably long-lasting protection:

- **DEET** (Chemical Name: N,N-diethyl-m-toluamide or N,N-diethly-3-methyl-benzamide)
- **Picaridin** (KBR 3023, Chemical Name: 2-(2-hydroxyethyl)-1-piperidinecarboxylic acid 1-methylpropyl ester)

- **Oil of Lemon Eucalyptus** or **PMD** (Chemical Name: para-Menthane-3,8-diol) the synthesized version of oil of lemon eucalyptus
- **IR3535** (Chemical Name: 3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester)
- **Permethrin** (3-Phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl) -2,2-dimethylcyclopropanecarboxylate) **–** Permethrin kills ticks and can be used on clothing (but not skin)

The EPA characterizes the active ingredients DEET and Picaridin as "conventional repellents" and Oil of Lemon Eucalyptus, PMD, and IR3535 as "biopesticide repellents", which are derived from natural materials.

In general, higher concentrations of active ingredient provide longer duration of protection, regardless of the active ingredient, although concentrations above approximately 50 percent do not offer a marked increase in protection time. Products with less than 10 percent active ingredient may offer only limited protection, often from 1 to 2 hours. Products that offer sustained release or controlled release (micro-encapsulated) formulations, even with lower active ingredient concentrations, may provide longer protection times. Regardless of what product you use, if you start to get mosquito bites reapply the repellent according to the label instructions or remove yourself from the area with biting insects if possible.

Clothing and other products can be purchased pre-treated, or products can be treated using EPA-registered products. Permethrin is the only pesticide approved by the EPA for these uses. Permethrin binds tightly to the fabrics, resulting in little loss during washing and minimal transfer to the skin. Permethrin is poorly absorbed through the skin, although sunscreens and other products may increase the rate of skin absorption.

If you decide to use permethrin-treated clothing, consider these tips:

- Read the application instructions carefully and apply the product according to the label directions. Do not over-treat products.
- Permethrin treatments are only intended for use on fabrics; do not apply them directly to the skin or other items.
- Do not apply permethrin to clothing while it is being worn.
- Apply the product to clothing outdoors in well ventilated areas that are protected from wind.
- Hang treated fabrics outdoors and allow them to dry completely before wearing them.
- Wash permethrin treated clothing separately from other clothing items.

1.6 Poisonous Plants

The potential for contact with poisonous plants, such as poison ivy, oak, and sumac exists when performing fieldwork in wooded or boggy areas. Urushiol, an oily organic allergen found in plants, can cause an allergic reaction when in contact with the leaves or vines.

Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison ivy grows throughout much of North America, including all states east of the Rocky Mountains. It is normally found in wooded areas, especially along edge areas where the tree line breaks and allows sunshine to filter through. It also grows in exposed rocky areas, open fields, and disturbed areas.

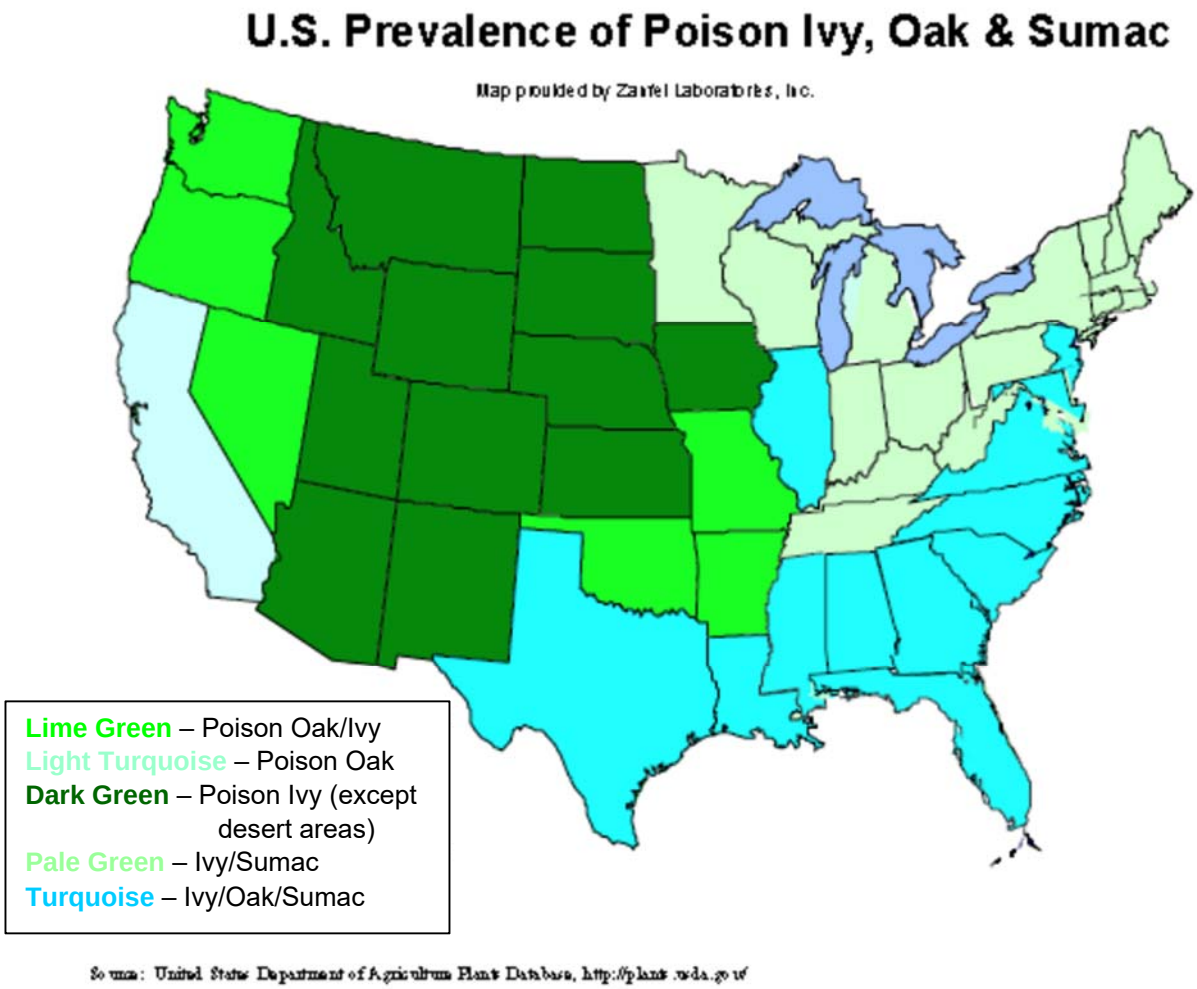
Poison oak can be present as a sparsely-branched shrub. Poison oak can grow anywhere in the United States with the exception of Hawaii, Alaska, and some southwest areas that have desert climates. Poison oak is similar to poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches.

Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety “down.” Poison sumac has white, “hairy” berry clusters. Poison sumac grows exclusively in very wet or flooded soils, usually in swamps and peat bogs, in the eastern United States.

Poison Ivy

Poison Oak

Poison Sumac



To prevent exposure to these poisonous plants:

- Wear proper PPE, including long sleeves, long pants, boots, and gloves.
- Barrier skin creams, such as lotion containing bentoquatum (Tecnu®), may offer some protection prevent the occurrence of exposure symptoms.
- Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. Employees with known allergies should identify themselves to the SSO or Project Manager prior to starting field work as a precautionary measure. If you believe you have contacted one of these plants:
    - Immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.
    - Contact the People and Safety Team and Project Manager immediately after caring for affected skin.

- Wash exposed clothing separately in hot water with detergent.

- After use, clean tools, and soles of boots with rubbing alcohol or soap and lots of water. Urushiol can remain active on the surface of objects for up to 5 years.
- If a rash occurs, contact the People and Safety Team and complete and submit an Incident Report Form. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

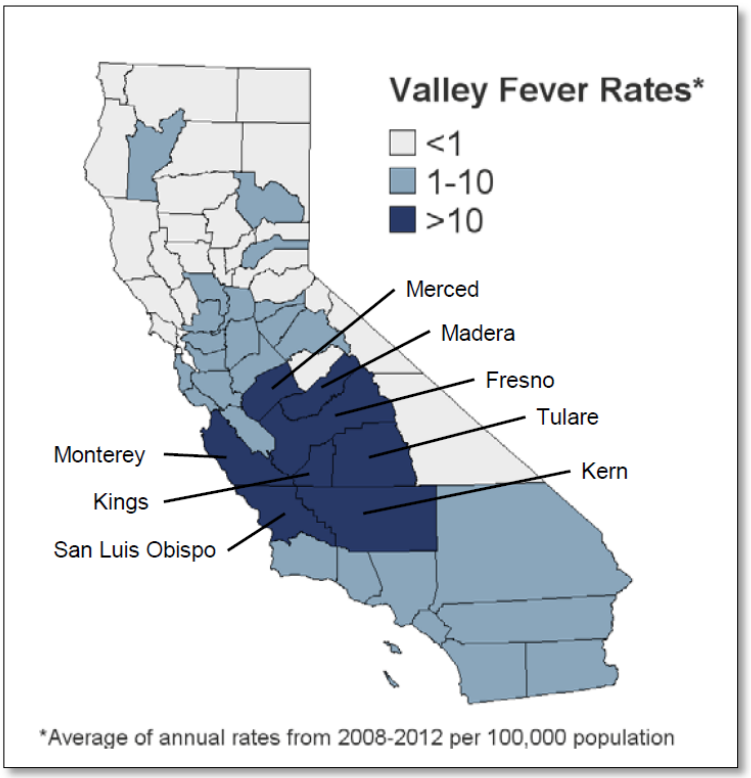
1.7 Sewage and Bacterial Impacted Sediments

Some project work may be conducted at sites that serve or have served as a combined sewer overflow and consequently may have received untreated sanitary sewage from numerous sources. Decomposed sewage can potentially be encountered within sites and their sediments. Sediments could contain soil and marine microorganisms, and bacterium associated with sewage. Many of these bacterium can cause illness through ingestion, direct contact, or the inhalation of a bio-aerosol possibly in the form of dust. Potential respiratory exposure to biological agents can also occur through the inhalation of aerosols produced during sediment handling activities. PPE as identified in the site-specific HASP will be worn to minimize potential exposures. Employees will follow the decontamination or disposal procedures identified in the HASP.

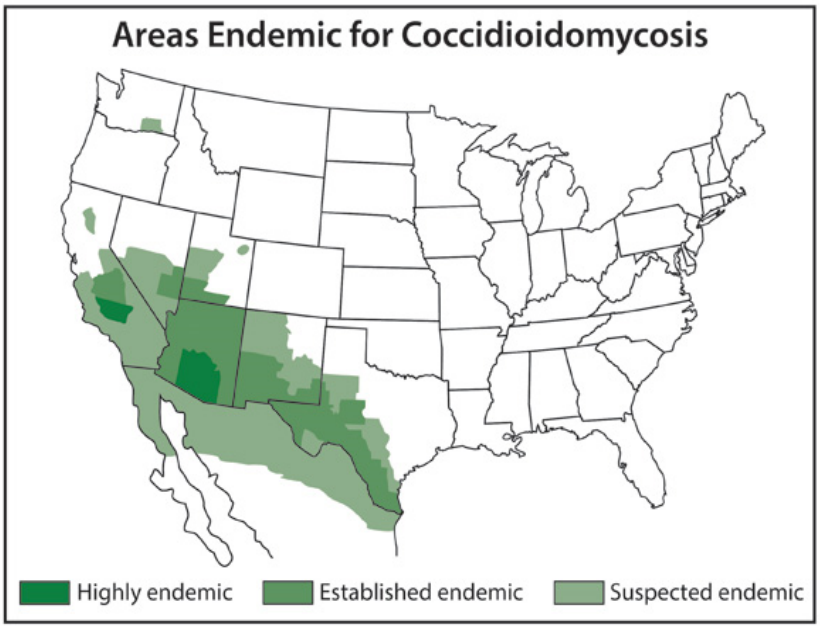
1.7.1 Fungal Spores in Soil – Valley Fever

Valley Fever is an illness that usually affects the lungs. It is caused by the fungus *Coccidioides immitis* that lives in the top 2 to 12 inches of soil in many parts of California. When fungal spores are present, any work activity that disturbs the soil, such as digging, grading, or other earth moving operations, or vehicle operation on dirt roads, can cause the spores to become airborne, therefore increasing the risk of Valley Fever. All employees on sites where the fungus is present, and who are exposed to dusty conditions and wind-blown dusts are at increased risk of becoming infected.

Valley Fever fungal spores are too small to be seen, and there is no reliable way to test the soil for spores before working in a particular place. Valley Fever can be found throughout the southwestern United States, parts of Mexico, and South America. Some California counties consistently have Valley Fever fungus present in the soil. In these regions Valley Fever is considered endemic. Health departments track the number of cases of Valley Fever illness that occur. This information is used to map illness rates as seen on the figures below from the Center of Disease Control Valley Fever Awareness website.



Rates of reported Valley Fever cases in California counties from 2008–2012. Darkest colored counties had the highest rates of Valley Fever.



When present, symptoms usually occur between 7 to 21 days after breathing in spores, and can include:

- Cough
- Fever
- Chest pain
- Headache
- Muscle aches
- Rash on upper trunk or extremities
- Joint pain in the knees or ankles
- Fatigue

Symptoms of Valley Fever can be mistaken for other diseases such as the flu (influenza) and TB (tuberculosis), so it is important for employees to obtain medical care for an accurate diagnosis and possible treatment.

While there is no vaccine to prevent Valley Fever, the following important steps must be taken in order to limit risk:

- Determine if the worksite is in an endemic area. Contact the local health department for more information about the risk in the county GEI is performing work that may disturb soils.
- Prepare work plans and work practices that reduce employee's exposure, which may include:
    - Provide air conditioned cabs with properly maintained dust filters for vehicles that generate heavy dust and make sure employees keep windows and vents closed.
    - Suspend work during heavy winds.
- When exposure to dust is unavoidable, National Institute for Occupational Safety and Health (NIOSH)-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or High Efficiency Particulate Air (HEPA) must be provided. The Project Manager must work with the Safety Team to develop and implement a respiratory protection program in accordance with California's Occupational Safety and Health Administration (Cal/OSHA's) Respiratory Protection standard (8 CCR 5144) for the project.
- Take measures to reduce transporting spores offsite, such as:
    - Clean tools, equipment, PPE, and vehicles before transporting offsite.
    - If employee's clothing is likely to be heavily contaminated with dust, provide coveralls and change rooms, and showers where possible.

1.8 Injury Reporting

If a GEI employee suffers an injury, bite, or sting on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.10 References

http://www.cdc.gov/ncidod/dvbid/westnile/index.htm
http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm
http://www.epa.gov/pesticides/health/mosquitoes/insectrp.htm
http://www.cdc.gov/niosh/topics/lyme/
Protecting Yourself from Ticks and Mosquitoes, NIOSH Fast Facts, Publication No. 2010-119
http://npic.orst.edu/pest/mosquito/ptc.html
http://www.cdc.gov/features/valley-fever-10-things/
https://www.cdph.ca.gov/HealthInfo/discond/Documents/VFGeneral.pdf
https://blog.epa.gov/blog/tag/mosquitoes/

1.11 Attachments

None

1.12 Contact

Health&SafetyTeam@geiconsultants.com

1.13 Review History

- June 2016
- June 2014
- November 2013
- October 2010

STANDARD OPERATING PROCEDURES

SOP No. HS-002 Infectious Materials and Bloodborne Pathogens Exposure Control Plan

1.1 Objective

GEI personnel may come in contact with potentially infectious agents (materials) when performing first aid or cardiopulmonary resuscitation (CPR). Employees may also come into contact with these agents when working at certain contaminated sites (i.e., urban sites, discarded contaminated needles, or sewer outfall exposures). This standard operating procedure (SOP) has been developed to minimize the potential for exposure to employees who may contact, directly or indirectly, infectious agents.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with infectious materials and bloodborne pathogens. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with infectious materials or bloodborne pathogens and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

Universal Precautions (i.e., treat all potentially infectious materials as if it were infected) will be used by GEI employees.

1.3 Exposure Control Plan

1.3.1 Standard Procedures

Sampling of potentially infectious materials will be performed in a manner that minimizes the potential for creating splashes, droplets, or aerosols. Mechanical pipetting devices will be used for manipulating sanitary sewer effluent. Mouth pipetting is prohibited.

The use of glassware or equipment with sharp or pointed edges will be kept at a minimum to reduce the potential of injury that would create a direct route of entry into the body for infectious materials.

Minor cuts, scratches, or other breaks in the skin barrier will be covered prior to the handling of infectious materials. Employees experiencing exudative lesions or weeping dermatitis will refrain from direct contact with infectious materials.

Eating, drinking, smoking, or application of cosmetics is not permitted in areas where potentially infectious materials are handled or sampled.

Employees will wash and disinfect their hands, face, or other potentially contaminated skin surfaces upon completing the handling of infectious or potentially infectious agents or after rendering first aid.

1.3.2 Personal Protective Equipment

Personal Protective Equipment (PPE) will be worn to reduce the potential of exposures to splashes or aerosols. At a minimum, PPE will include safety glasses and appropriate gloves, but may also require the use of face, respiratory, foot, and full-body protection. Refer to the site-specific HASP for specific PPE requirements.

Disposable PPE used in the handling or sampling of infectious materials will be appropriately disposed of and not reused.

1.3.3 Medical Monitoring

Medical monitoring is required for an employee when a potential workplace exposure has occurred. The employee must follow the GEI Incident Reporting procedures regarding the potential exposure as soon as possible. For infectious agents in which a medically accepted vaccination has been developed (e.g., hepatitis B virus) (HBV) potentially exposed employees will be given the option to receive an inoculation at no cost. Employees who have been exposed will be given the option to receive a confidential medical evaluation also at no cost. Required records for exposed employees will be kept confidential.

1.3.4 Training

Employees with a reasonable risk for exposure must complete Bloodborne Pathogen training covering the following topics:

- An explanation of the Occupational Health and Safety Administration (OSHA) bloodborne pathogen standard.
- A general explanation of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne diseases.
- An explanation of the GEI's Bloodborne Pathogen SOP and exposure control plan.
- Appropriate methods for recognizing tasks that involve potential exposure.
- An explanation of the use and limitations of methods to prevent exposure.
- Proper types, use, handling, decontamination, and disposal of PPE.
- The availability of HBV vaccines and the procedures for obtaining a vaccination.
- Appropriate actions to take during an emergency involving bloodborne pathogens.
- Post-exposure procedures.
- An explanation of required signs and labels.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.6 Attachment

None

1.7 Reference

OSHA 29 CFR 1910.1030 – Bloodborne Pathogens

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- June 2016
- June 2014
- November 2013
- January 2011
- November 2010

STANDARD OPERATING PROCEDURE
HS-004 Driver Safety

1.1 Objective

GEI has implemented a Safe Driving Program to encourage safe driving habits and promote the ongoing safety of our staff and the communities where we work. For more information, refer to the Operation of Vehicles section of GEI's Employee Handbook.

This Standard Operating Procedure (SOP) provides requirements and recommendations to minimize the potential risks while operating or riding in a motor vehicle.

1.2 General

GEI employees will adhere to the following requirements when operating a vehicle while conducting business on behalf of GEI. These requirements apply to GEI-owned, rental, and personal vehicles used to conduct GEI business:

- Employees must maintain a valid and current driver's license.
- Employees using a personal vehicle for work-related travel must have proper insurance coverage that meets the requirements in the state in which they reside.
- Employees must wear their safety belt while in a moving vehicle.
- Vehicle incidents will be reported in accordance with GEI's Incident Reporting procedures (*refer to* GEI's Safety App for smart phones or the Safety page on the GEI intranet.).
- Vehicles will be properly maintained and safely operated (*refer to* GEI's Fleet Maintenance Program).
- Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction. Employees should not exceed the posted speed limit and should maintain a safe distance between other vehicles.
- When parking a vehicle at a job site, the employee should position the vehicle in a manner which reduces or eliminates the need to operate the vehicle in reverse. It is recommended, a safety cone should be placed at the rear of the vehicle after parking the vehicle and be removed prior to moving the vehicle. This precautionary measure makes the employee aware of other vehicles, equipment, and structures within the backup radius of the vehicle.

When driving an unfamiliar vehicle (rental or GEI-owned), it is the driver's responsibility to orient themselves to the vehicle by:

- Walking around the vehicle to observe the condition of the vehicle and hazards that could be within the travel path.
- Becoming familiar with the size of the vehicle.
- Note if the vehicle has anti-lock braking system (ABS[1]).
- Adjusting mirrors (rear and side).
- Adjust seats to be situated as far back as safely practical, away from the air bag, located in the steering wheel.
- Becoming familiar with dashboard, center console, and steering controls.
- Locating the turn signals, windshield wipers, lights, emergency flashers, and the heating, air conditioning, and defrost controls.

1.3 Driving Defensively

Driving defensively means not only taking responsibility for oneself and actions but also keeping an eye on "the other guy." Good defensive drivers may be able to anticipate what the other driver will do next. GEI recommends the following guidelines to help reduce risks while driving:

- Do not start the vehicle until each passenger and any belongings are secured in the vehicle.
- Remember that driving above or below the speed limit can increase the likelihood of a collision.
- Be aware of impaired drivers; if a car is straddling the center line, weaving, making wide turns, stopping abruptly, or responding slowly to traffic signals, the driver may be impaired or using a cellular telephone. Avoid an impaired driver by turning right at the nearest corner or exiting at the nearest exit.
    - If it appears that an oncoming car is crossing into your lane, pull over to the roadside, sound the horn, and flash the headlights.
    - If an unsafe or suspicious driver is observed, notify the police.
- Follow the rules of the road. Do not contest the "right of way" or try to race another car during a merge. Always be respectful of other motorists.

[1] ABS is a mechanism that allows the wheels on a vehicle to maintain contact with the surface of the road, based on inputs from the driver (braking), to prevent the wheels from locking up (ceasing rotation) and to avoid an uncontrolled skid.

- Allow large vehicles, including tractor trailers, extra breaking distance, turning radius, and avoid traveling in the other driver's blind spots.
- Do not follow too closely. GEI employees should use a minimum of "3-second following distance."
- While driving, be cautious, aware, and responsible.
- Use extra caution, observe road signs, and reduce speed in construction areas and school zones.
- Always be aware of pedestrians, bicyclists, and motorcyclists.

1.4 Cellular Phone Use and Other Distractions

Refer to the *Portable Communication Device Use While Driving* section of the GEI Employee Handbook for GEI's policy on the use of cellular telephones while operating a vehicle.

1.5 Drugs and Alcohol

The use of illegal drugs or alcohol is prohibited when driving a vehicle on GEI business. Be aware of the side effects of prescription and over-the-counter medications which can impair an employee's ability to drive.

1.6 Adverse Driving Conditions

When operating a vehicle, its possible adverse driving conditions may be encountered. Below is a list of possible conditions and how they can be mitigated.

1.6.1 Driving at Night

Vision maybe limited at night due to impairment of the driver's depth perception, color recognition, and peripheral vision. Another factor adding danger to night or early morning driving is fatigue. Drowsiness makes driving more difficult by dulling concentration and slowing reaction time. Effective measures to minimize these hazards by preparing the car and following guidelines:

- Check the headlights to ensure they are properly aimed. If you notice the headlights are not properly aimed, report it to the Branch Manager, or if applicable the rental car agent. Misaimed headlights blind other drivers and reduce the driver's ability to see the road.
- In addition to the known hazards of consuming alcohol prior to driving, night driving can potentially be affected because the recovery rate of glare from headlights is prolonged. Thus reducing your ability to see.

- Smoking in GEI vehicles and rentals is not permitted. When driving a personal vehicle for business, avoid smoking while driving. Nicotine and carbon monoxide may hamper night vision.
- Observe driving safety as soon as the sun goes down. Twilight is one of the most difficult times to drive, because the eyes' pupils are constantly changing to adapt to the growing darkness Always use headlights at dusk and at dawn; lights will not help the driver see better in early twilight, but they will make it easier for other drivers to see your car. Drive at a speed that allows you to see the road that is within the headlights span. Driving in a manner that prevents you from seeing hazards as they are illuminated is known as overdriving the headlights; it may be necessary for the driver to reduce speed to be prepared to brake within the illuminated area of the headlights.
- If an oncoming vehicle does not lower beams from high to low, avoid glare by watching the right edge of the road and using it as a steering guide.
- The driver should make frequent stops for light snacks and exercise. If the driver is too tired to drive, stop in a safe area and get some rest.

1.6.2 Snow/Freezing Conditions

When snow and ice are present, be prepared by following these winter driving safety tips.

1.6.2.1 Prepare the Vehicle Before a Snowstorm

- Check under the hood and take a look at the vehicles cooling system. Make sure the vehicle contains adequate antifreeze and the hoses are in good condition.
- Test heaters and defrosters ahead of time to make sure they are in good working condition.
- Test the windshield wipers and check the condition of the wiper blades. If wipers leave streaks on the windshields, replace the blades at the next possible opportunity. Keep the receipt to expense the cost with GEI or with the car rental company.
- It is recommended that a windshield washer/antifreeze solution is used during winter conditions.
- Check the lights on the vehicle and periodically clear them of snow and dirt.
- Vehicle batteries need extra power in cold conditions. Make sure the battery's terminals are clean and cables are secure.
- Determine if the vehicle has a anti-lock brake (ABS) system.
- Keep the gas tank at least half-full in the winter to help avoid gas line freeze up.

1.6.2.2 Driving During and After a Snowstorm

- Wear sunglasses to aid in limiting reflection from snow.
- Be aware of blind spots created by snow banks.
- Be extra cautious of pedestrians and other vehicles in intersections.
- Allow extra time for braking and increase the distance between your car and the car immediately in front of the car.
- Reduce speed and do not exceed the posted limit.
- If the tires starts to lose traction, remove the foot off the gas and gradually reduce speed. Accelerate slowly once traction is regained.
- If the vehicle starts to skid, and does not have anti-lock brakes, steer into the skid. This will bring the back end of the car in line with the front. Avoid using the brakes. If the vehicle does have anti-lock brakes, firmly brake as you steer into the skid.

1.6.3 Driving In the Rain

To prevent losing control of the car on wet pavement, take these preventive measures.

- Prevent skids by driving slowly and carefully, especially on curves.
- Steer and brake with a light touch.
- When necessary to stop or slow, do not brake hard or lock the wheels.
- Maintain mild pressure on the brake pedal.

Skidding
If the car begins to skid, ease the foot off the gas, and carefully steer the car in the direction you want the front of the car to go. For cars without anti-lock brakes, avoid using the brakes. This procedure, known as “steering into the skid,” will bring the back end of the car in line with the front. If the car has anti-lock brake systems (ABS), brake firmly as you steer into the skid.

Hydroplanning
Hydroplaning happens when the water in front of the tires builds up faster than the car’s weight can push it out of the way. The water pressure causes the car to lose contact with the road surface and slide on a thin layer of water between the tires and the road. At this point, the car can be completely out of contact with the road, making it possible for the driver to skid or drift out of the lane, or even off the road.

To avoid hydroplaning, keep the tires properly inflated and maintain good tread on the tires. If tires need to be replaced on a company vehicle, notify the branch manager or their designee. Slow down when roads are wet, and stay away from puddles. Try to drive in the tire tracks left by the cars in front of the vehicle. If the car begins to hydroplane, do not brake or turn suddenly. This could throw the car into a skid. Ease the foot off the gas until the car slows; accelerate slowly once traction is regained. If braking is needed, do so gently with light pumping actions. If the car has ABS, brake normally; the car's computer will mimic a pumping action, as necessary.

If weather conditions worsen to the point where the driver is not comfortable driving, pull the vehicle over to a safe location until conditions improve. Do not drive during severe weather conditions. Do not attempt to drive on roads with standing water or that have been flooded. Find an alternate route if these conditions exist.

1.6.4 Off Road

If operation of a vehicle is required off public or private roads or in situations where four-wheel-drive vehicles are required, the appropriate vehicle for the situation will be used.

Be sure any gear or equipment is secured inside the vehicle so it doesn't bounce around while the vehicle is off-road.

- Know the underside of the vehicle. Look under the vehicle and learn where the lowest-hanging parts are located so they are not damaged.
- Scout tricky terrain on foot. Don't hesitate to get out of the vehicle to examine, up close, the terrain and soil conditions. And be sure to scout out what's on the other side of a hill ahead of time so there are no surprises.
- Drive cautiously. Drive, "as slow as possible, as fast as necessary." Remember to use the gears to efficiently manage engine power, braking, and torque.
- Create a mental picture. Look ahead and visualize the paths to the vehicle will travel. Follow those paths.
- Drive straight up and down hills. Avoid diagonal lines that put the vehicle in a situation where it might roll.

1.7 Driver Training

GEI employees are required to complete driver safety training every 3 years. This training is managed by the People Team and will be assigned through GEI's e-learning provider.

1.8 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on GEI's Safety App (for smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP.

1.10 References

National Safety Council
Oklahoma Safety Council
GEI Consultants, Inc. Employee Handbook

1.11 Attachments

None

1.12 Contact

Health&Safetyteam@geiconsultants.com

1.13 Review History

- November 2016
- May 2014
- November 2013
- January 2011

STANDARD OPERATING PROCEDURES

SOP No. HS-008a Non-Powered Hand Tools

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees working with non-powered hand tools. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the hazards associated with the non-powered hand tools that will be used. These hazards should be reviewed during the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Misuse of hand tools accounts for the majority of accidents and injuries involving hand tools. Only use a tool for the task which it was designed for. If the right tool isn't available contact the Project Manager and discuss what is needed. Improper maintenance is another leading cause of injuries. Employees using hand tools may be exposed to a number of other potentially serious hazards: falling objects (i.e., objects can fall as a result of contact with tools or objects which are abrasive or splash), harmful dust, fumes mists, vapors, and gases, as well as contact with electrical power sources.

1.2.1 Condition of Tools

All hand tools, whether furnished by GEI or the employee, will be maintained in safe working condition. All hand tools must be inspected before use. Never use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose. Never use impact tools such as hammers, chisels, punches or steel stakes having mushroomed (flattened) heads. Tag worn, damaged or defective tools "Out of Service" and do not use them; notify your Branch Manager or Project Manager so that the tool can be replaced or repaired. If the tools cannot be repaired they will be disposed of properly. GEI does not issue or permit the use of unsafe hand tools.

1.2.2 Personal Protective Equipment

Employees using hand tools will be provided with the personal protective equipment (PPE) necessary to protect them from the hazard of the tool as well as the associated hazards with using the tool. (i.e., projectile debris, dust, etc.). All employees will wear work gloves, steel toe or composite toe boots, and safety glasses at a minimum. In addition, face shields and hearing protection may be required. Most hand injures can be avoided with the proper use of PPE. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI's Corporate Health and Safety Program.

1.2.3 General Safe Practices

Never wear sandals, open-toed or canvas shoes when working with tools. Always tie back long hair. Avoid loose-fitting clothes which might become entangled in a tool. Always remove rings and other jewelry. Make sure your grip and footing are secure when using large tools. Never carry tools up ladders; use a tool belt, hoist, or a rope. Use extra caution when using tools at heights – a falling tool could kill a co-worker. Always pass a tool to another person by the handle – never toss it to them. Never use a tool with hands are wet, oily, or greasy. Select ergonomically-designed tools for work tasks when movements are repetitive and forceful. Always make sure observers are at a safe distance. Always secure work with a vice, clamp, or other support.

1.3 Non-Power Hand Tools

Non-powered hand tools include anything from axes to wrenches. Even though the tool is powered by human inertia, injuries from improper use of non-powered hand tools often involve severe disabilities.

1.3.1 Knives

Only use a knife with a sharpened blade. Pull the knife through the object and away from your body; pulling motions are easier to manage. Never use a knife if its handle has splinters, burrs, cracks, splits or if the blade is loose. Knives should never be used as screwdrivers, pry bars, or can openers. Never pick up knives by their blades. Always carry knives with their tips/points toward the floor. Never carry knives, scissors, or other sharp tools in pockets. Never attempt to catch a falling knife. When not in use, knives should be stored in sheaths. Box cutters will be self-retracting.

1.3.2 Wrenches

Never use wrenches that are bent, cracked, badly chipped, or having loose or broken handles. Discard any wrench with spread or battered jaws; if the handle is bent; or if a wrench has broken or battered points and notify your Branch Manager so that a replacement can be made. Never slip a pipe over a single head wrench handle to increase leverage. Never use a shim to make a wrench fit. Pull on a wrench using a slow, steady motion. Do not use push force on a wrench; you could lose your balance if the wrench slips.

1.3.3 Screwdrivers

Always match the size and type of screwdriver blade to fit the head of the screw. Do not hold the work piece against your body while using a screwdriver. Never put your fingers near the tip of a screwdriver when tightening a screw. Never use a screwdriver to make a starting hole for screws. Never use a screwdriver as a chisel, pry bar, or nail puller. When performing electrical work, always use an insulated screwdriver. Never use a screwdriver to test the charge of a battery.

1.3.4 Hammers

Never use a hammer if your hands are oily, greasy or wet. Always check behind you before swinging a hammer. Use a claw hammer for pulling nails. Never strike nails or other objects with the "cheek" of the hammer. Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer. Never strike one hammer against another hammer. Never use a hammer as a wedge or a pry bar.

1.3.5 Pliers

Never use pliers which are cracked, broken, or sprung. Never use pliers as a wrench or a hammer. Do not attempt to force pliers by using a hammer on them. Never slip a pipe over the handles of pliers to increase leverage. When performing electrical work, always use insulated pliers. When using diagonal cutting pliers, shield loose pieces of cut material from flying into the air by using a cloth or your gloved hand.

1.3.6 Snips

Never use snips as a hammer, screwdriver, or pry bar. Always wear safety glasses or safety goggles when using snips to cut materials. Always wear work gloves when cutting materials with snips. Keep the blade aligned by tightening the nut and bolt of the snips. Never use straight cut snips to cut curves. Always use the locking clip on the snips when you have finished using them. Never leave or store snips in the open position.

1.3.7 Hand Saws

Always keep handsaws sharp and free of rust to prevent them from binding or jumping. Never carry a saw by the blade. Always hold the work piece firmly against a work table. Keep control of saws by releasing downward pressure at the end of the stroke. Never use an adjustable blade saw such as a hacksaw, coping saw, keyhole saw, or bow saw, if the blade is not taut. Oil saw blades after each use. Never force the saw through the cut as this may cause the saw to buckle or fly out of the groove and cause injury.

1.3.8 Chisels

Only use sharpened chisels. Never use chisels having mushroomed (flattened) striking heads. Whenever possible, hold a chisel by using a tool holder. Clamp small work pieces in a vise and chip towards the stationary jaw of the vise. Chip or cut away from yourself and keep both hands in back of the cutting edge. Always wear safety glasses or a face shield.

1.3.9 Vise and Clamps

Never use a vise having worn or broken jaw inserts, or having cracks or fractures in the body of the vise. Position the work piece in the vise so the entire face of the jaw supports the work piece. When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand or saw horse. Never slip a pipe over the handle of a vise to increase leverage. Never use a C-clamp for hoisting materials. Never use a C-clamp as a permanent fastening device.

1.3.10 Jacks

A manufacture's rated capacity must be clearly marked on all jacks and all jacks must have a stop indicator. When using a jack, never exceed the capacity of the stop indicator. Jacks should be lubricated and inspected regularly. When setting up a jack, ensure the base is centered on a firm, level surface. The jack head should also be placed against a level surface. Lift force should be applied evenly. Put a block under the base of the jack when the foundation is not firm. If it seems likely the cap could slip, place a block between the jack cap and load. Immediately block the load after it is lifted.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or supervisor/project manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP or in the manufacturer's specifications. Appropriate PPE must be worn correctly to provide the intended level of protection. If a hand tool is being used that is not identified in this SOP consult the manufacturer's literature and contact the Safety Team so we can include the information in a future version of this SOP.

1.6 References

OSHA Standards for the Construction Industry, Subpart I
Risk Analytics, LLC Hand Tools Training, 2006

1.7 Attachments

None

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- July 2016
- May 2014
- August 2011
- October 2010
- One revision date unable to be found

STANDARD OPERATING PROCEDURES
SOP No. HS-010 Inclement Weather

1.1 Objective
This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with the potential to be affected by inclement weather. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for working in inclement weather and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General
Employees should be aware of local weather conditions and monitor advisories issued by the National Weather Service and other local reporting services. Depending on location and season, storms are capable of producing heavy rain, floods, extreme temperatures, high wind conditions, lighting, tornados, and/or snowfall.

1.2.1 Heavy Rain
If working or driving in a rain storm, use extreme caution. When driving, turn your low beam lights on when the rainfall becomes heavy. Employees should be aware of the following:

- Heavy rain decreases visibility, especially when driving.
- Surfaces and tools become slippery.
- If you are working in the rain and your clothes become wet there is a risk of hypothermia when exposed to winds, even in warm temperatures.
- If the storms are going to produce thunder and/or lightning, leave the work area immediately and move to a safe area.
- Use your best judgment to determine if the rainfall becomes too heavy to continue working safely.

1.2.2 Lightning
Lightning can strike as far as 10 miles from the area where it is raining. That's approximately the distance you can hear thunder. **If you can hear thunder, you are within striking distance. Seek safe shelter immediately.** This can be within a building or vehicle. Wait 30 minutes after the last clap of thunder or flash of lightning before going outside again.

1.2.3 Flooding

Flooding may occur as a result of heavy rain in a short period of time. Flooding can be particularly acute in canyon areas where dry creek beds can turn into raging rivers from rainfall in distant or higher elevation areas. Be aware of this and your surroundings and move to a safe place if you begin to see signs that flooding may occur. Signs of potential flooding include sudden appearance of water in dry creek beds, increased water flow in rivers or streams, or quick rise in water levels.

Do not attempt to drive through areas or streets that are flooded. Seek alternate routes. Be particularly cautious at night when flooded areas are difficult to see. Urban flooding can stop traffic; increase the potential for traffic accidents; and can trap people in vehicles.

1.2.4 Extreme Temperatures

Work activities may take place in extreme heat or cold. Be prepared if these conditions are anticipated. Have the appropriate personal protective equipment (PPE) available; exercise proper fluid intake; and take breaks to prevent heat and cold stress. For more information about these conditions see the heat stress and cold stress programs found in GEI's Health and Safety Program.

1.2.5 High Winds, Tropical Storms, and Tornados

High Winds can be extremely dangerous. Appropriate measures will be taken to secure equipment and loose items when working in windy conditions. The project manager should be contacted about the weather conditions and, if necessary, work should be postponed.

Tropical storms are described as storms with sustained winds ranging from 39 to 73 miles per hour (mph) and hurricanes produce sustained winds that exceed 74 mph. When winds approach 40 mph (gale force winds) twigs begin to break off of trees and vehicles will veer off of the road. When winds approach 40 mph or the GEI employee feels unsafe based on the activities being performed, stop work and seek shelter as soon as possible. Blowing or falling debris and overhanging limbs/signs can be a significant hazard. If possible, avoid driving in these conditions; 70 percent of injuries during hurricanes are a result of vehicle accidents. Note that tall or elevated equipment will have manufacturer's safe operating wind speeds defined that could be less than 40 mph. The operator's manual should be consulted prior to operation of the equipment.

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. The Fujita Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure. Based on the Fujita Scale, or F-Scale, numbers begin at F0: 40-72 mph and go to F6: 319-379 mph (F6 is

STANDARD OPERATING PROCEDURES

SOP No. HS-001 Biological Hazards

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the potential for GEI personnel to encounter biological hazards during field activities.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with biological hazards such as animals, insects, plants, and sewage. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with biological hazards and the control methods to be implemented by GEI employees. These hazards must be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Mammals

During some site operations, animals such as stray or domesticated dogs or cats, raccoons, snakes, bears, rats, bats, etc. may be encountered. Employees should use discretion and attempt to avoid contact with animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

1.3.1 Rabies

The rabies virus is transmitted through the bite of an infected animal or contact with saliva or brain/nervous system tissue of an infected animal. The rabies virus infects the central nervous system, causing disease in the brain. The early symptoms of rabies in people are fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

If you are bitten or think you may be exposed, wash any wounds immediately and thoroughly with soap and water. Then go to the hospital emergency room and notify the Project Manager and the People Safety Team. The doctor, possibly in consultation with the state or local health department, will decide if you need a rabies vaccination. Decisions to start series of vaccinations will be based on your type of exposure and the animal you were exposed to, as well as laboratory and surveillance information for the geographic area where the exposure occurred. If possible have someone document what type of animal it was, how it was behaving prior to the bite, what caused it to bite the

employee, and if it's not a domestic animal that would be easy to find again in the future, try to get animal control on site to capture it. An Incident Report Form must be completed and submitted, per GEI's Incident reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

1.4 Insects and Arachnids

Insects, including bees, wasps, hornets, mosquitoes, ticks, spiders, etc., may be present at a job site making the chance of a bite/sting possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life-threatening condition. Some insect bites can transmit diseases such as Lyme disease or a virus such as West Nile. The following is a list of preventive measures:

- Apply insect repellent prior to performing field work and as often as needed throughout the work shift.
- Wear proper personal protective equipment (PPE), including protective clothing (work boots, socks, and light colored clothing).
- Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk).
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- Field personnel who have or may have insect allergies must have insect allergy medication onsite and must inform the Site Safety Officer (SSO) and the People and Safety Team of their particular allergy prior to commencing work.
- Field personnel should perform a self-check at the end of the day for ticks.

1.4.1 Tick-borne Diseases

Lyme Disease

Lyme disease is caused by infection from a deer tick that carries a spirochete (a bacterium). During the painless tick bite, the spirochete may be transmitted into the bloodstream, often after feeding on the host for 12 to 24 hours. The ticks that cause the disease are often no bigger than a poppy seed or a comma in newsprint. The peak months for human infection are from May to September.

Symptoms appear in three stages. First symptoms usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick was attached. The rash is often bulls-eye like with red around the edges and clear in the center. The rash may be warm, itchy, tender, and/or "doughy." This rash appears in only 60 to 80 percent of infected persons. An infected

person also has flu-like symptoms of a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. These symptoms often disappear after a few weeks.

The second stage symptoms, which occur weeks to months later include meningitis, severe headache, drooping of the muscles on the face, called Bell's Palsy, encephalitis, numbness, withdrawal, and lethargy. These symptoms may last for several weeks to several months. Third stage symptoms, which occur months or years later include arthritis, heart problems, and loss of memory. The third stage symptoms may mimic multiple sclerosis and Alzheimer's disease.

When in areas that could harbor deer ticks, employees should wear light color clothing, and visually check themselves and check and be checked by another employee when coming from wooded or vegetated areas. If a GEI employee has a tick bite, the People and Safety Team and Project Manager must be contacted immediately. The employee will be offered the option for medical treatment by a physician, which typically involves antibiotics. An Incident Report form must be completed in compliance with the Incident Reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

If personnel feel sick or have signs similar to those mentioned above, the SSO and the People and Safety Team must be notified immediately.

Figure 1: From left to right, the deer tick adult female, adult male, nymph, and larva on a centimeter scale.

How to Remove a Tick

A tick can be removed from the skin by pulling gently at the head with tweezers. If tweezers are not available, use tissue paper or cloth to grasp the tick. It is important to grasp the tick as close to the site of attachment and use a firm steady pull to remove it. Wash hands immediately after with soap and water. The affected area should also be washed with soap and water, then disinfected with an antiseptic wipe, if available. All mouth parts must be removed from the skin. If the tick was removed by breaking off the

mouth parts, an irritation or infection may occur because the organism that is causing the disease can still enter the body through the skin.

Treatment for Lyme Disease

Treatment with antibiotics is effective and recovery is usually complete. For first stage symptoms, antibiotics are usually given orally. However, treatment for second and third stage symptoms is prolonged and recovery may take longer. Antibiotic treatment is usually provided intravenously for second and third stage Lyme disease.

Babesiosis

The deer tick can also cause Babesiosis, an infection of the parasite Babesia Microti. Symptoms of Baesiosis may not be evident, but may also include fever, fatigue and hemolytic anemia lasting from several days to several months. Babesiosis is most commonly diagnosed in the elderly or in individuals whose immune systems are compromised. If there are no signs or symptoms of Babesiosis, usually no treatment it needed. If an employee believes they might have Babesiosis they'll see a physician to be tested. Treatment usually consists of taking prescription medications for 7 to 10 days.

Ehrlichiosis

Ehrlichiosis is a tick-borne disease which can be caused by either of two different organisms. Human monocytic ehrlichiosis (HME) is caused by *Ehrlichia chaffeensis*, which is transmitted by the lone star tick (*Amblyomma americanum*). Human granulocytic anaplasmosis (HGA), previously known as human granulocytic ehrlichiosis (HGE), is caused by *Anaplasma phagocytophilia*, which is transmitted by the deer tick (*Ixodes scapularis*).

Ehrlichiosis is transmitted by the bite of infected ticks, including the deer tick and the lone star tick. The symptoms of HME and HGE are the same and usually include fever, muscle aches, weakness and headache. Patients may also experience confusion, nausea, vomiting and joint pain. Unlike Lyme disease or Rocky Mountain spotted fever, a rash is not common. Infection usually produces mild to moderately severe illness, with high fever and headache, but may occasionally be life-threatening or even fatal. Symptoms appear 1 to 3 weeks after the bite of an infected tick. However, not every exposure results in infection. For those that become infected a drug called Doxcycline will be prescribed.

Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is a tick-borne disease caused by a rickettsia (a microbe that differs somewhat from bacteria and virus). In the eastern United States, children are infected most frequently, while in the western United States, disease incidence is highest among adult males. Disease incidence is directly related to exposure to tick-infested habitats or to infested pets. Rocky Mountain spotted fever is characterized by a sudden onset of moderate to high fever (which can last for 2-3 weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash begins on the legs or arms, may include the

soles of the feet or palms of the hands and may spread rapidly to the trunk or rest of the body. Symptoms usually appear within 2 weeks of the bite of an infected tick. Like Ehrlichiosis the prescription drug Doxcycline is the first line treatment option.

1.4.2 Mosquito-Borne Disease

West Nile Virus
West Nile Virus is a mosquito-borne infection transmitted through the bite of an infected mosquito. The symptoms of West Nile Virus can be asymptomatic (no symptoms) or in more serious cases can lead to West Nile Fever. West Nile Fever can include fever, headache, tiredness, body ache, an occasional rash on the trunk of the body, and swollen lymph glands, In severe cases, people have developed West Nile Encephalitis or Meningitis which symptoms include fever, headache, neck stiffness, tremors, coma, and in some cases death. The incubation period for the disease is usually 2 to 15 days. The symptoms can range from a few days to several weeks. Most mosquitoes are not infected and the chance of infection from a mosquito bite of an on-site employee is very small.

1.5 Repellants

The following precautions will be used to help reduce the risk of mosquito bites:

Reduce mosquito-breeding areas by making sure wheelbarrows, buckets, and other containers are turned upside down when not used so that they do not collect standing water. According to the Environmental Protection Agency (EPA), many mosquitoes can breed in pooled water that's minimal enough to fill a bottle cap.

Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many mosquitoes are most active (between dawn and dusk).

Use mosquito repellant according to the manufacturer's directions when outdoors for long periods of time and when mosquitoes are most active.

Centers for Disease Control and Prevention (CDC) evaluation of information contained in peer-reviewed scientific literature and data available from the EPA has identified several EPA-registered products that provide repellent activity sufficient to help people avoid the bites of disease carrying mosquitoes. Products containing these active ingredients typically provide reasonably long-lasting protection:

- **DEET** (Chemical Name: N,N-diethyl-m-toluamide or N,N-diethly-3-methyl-benzamide)
- **Picaridin** (KBR 3023, Chemical Name: 2-(2-hydroxyethyl)-1-piperidinecarboxylic acid 1-methylpropyl ester)

- **Oil of Lemon Eucalyptus** or **PMD** (Chemical Name: para-Menthane-3,8-diol) the synthesized version of oil of lemon eucalyptus
- **IR3535** (Chemical Name: 3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester)
- **Permethrin** (3-Phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl) -2,2-dimethylcyclopropanecarboxylate) **–** Permethrin kills ticks and can be used on clothing (but not skin)

The EPA characterizes the active ingredients DEET and Picaridin as "conventional repellents" and Oil of Lemon Eucalyptus, PMD, and IR3535 as "biopesticide repellents", which are derived from natural materials.

In general, higher concentrations of active ingredient provide longer duration of protection, regardless of the active ingredient, although concentrations above approximately 50 percent do not offer a marked increase in protection time. Products with less than 10 percent active ingredient may offer only limited protection, often from 1 to 2 hours. Products that offer sustained release or controlled release (micro-encapsulated) formulations, even with lower active ingredient concentrations, may provide longer protection times. Regardless of what product you use, if you start to get mosquito bites reapply the repellent according to the label instructions or remove yourself from the area with biting insects if possible.

Clothing and other products can be purchased pre-treated, or products can be treated using EPA-registered products. Permethrin is the only pesticide approved by the EPA for these uses. Permethrin binds tightly to the fabrics, resulting in little loss during washing and minimal transfer to the skin. Permethrin is poorly absorbed through the skin, although sunscreens and other products may increase the rate of skin absorption.

If you decide to use permethrin-treated clothing, consider these tips:

- Read the application instructions carefully and apply the product according to the label directions. Do not over-treat products.
- Permethrin treatments are only intended for use on fabrics; do not apply them directly to the skin or other items.
- Do not apply permethrin to clothing while it is being worn.
- Apply the product to clothing outdoors in well ventilated areas that are protected from wind.
- Hang treated fabrics outdoors and allow them to dry completely before wearing them.
- Wash permethrin treated clothing separately from other clothing items.

1.6 Poisonous Plants

The potential for contact with poisonous plants, such as poison ivy, oak, and sumac exists when performing fieldwork in wooded or boggy areas. Urushiol, an oily organic allergen found in plants, can cause an allergic reaction when in contact with the leaves or vines.

Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison ivy grows throughout much of North America, including all states east of the Rocky Mountains. It is normally found in wooded areas, especially along edge areas where the tree line breaks and allows sunshine to filter through. It also grows in exposed rocky areas, open fields, and disturbed areas.

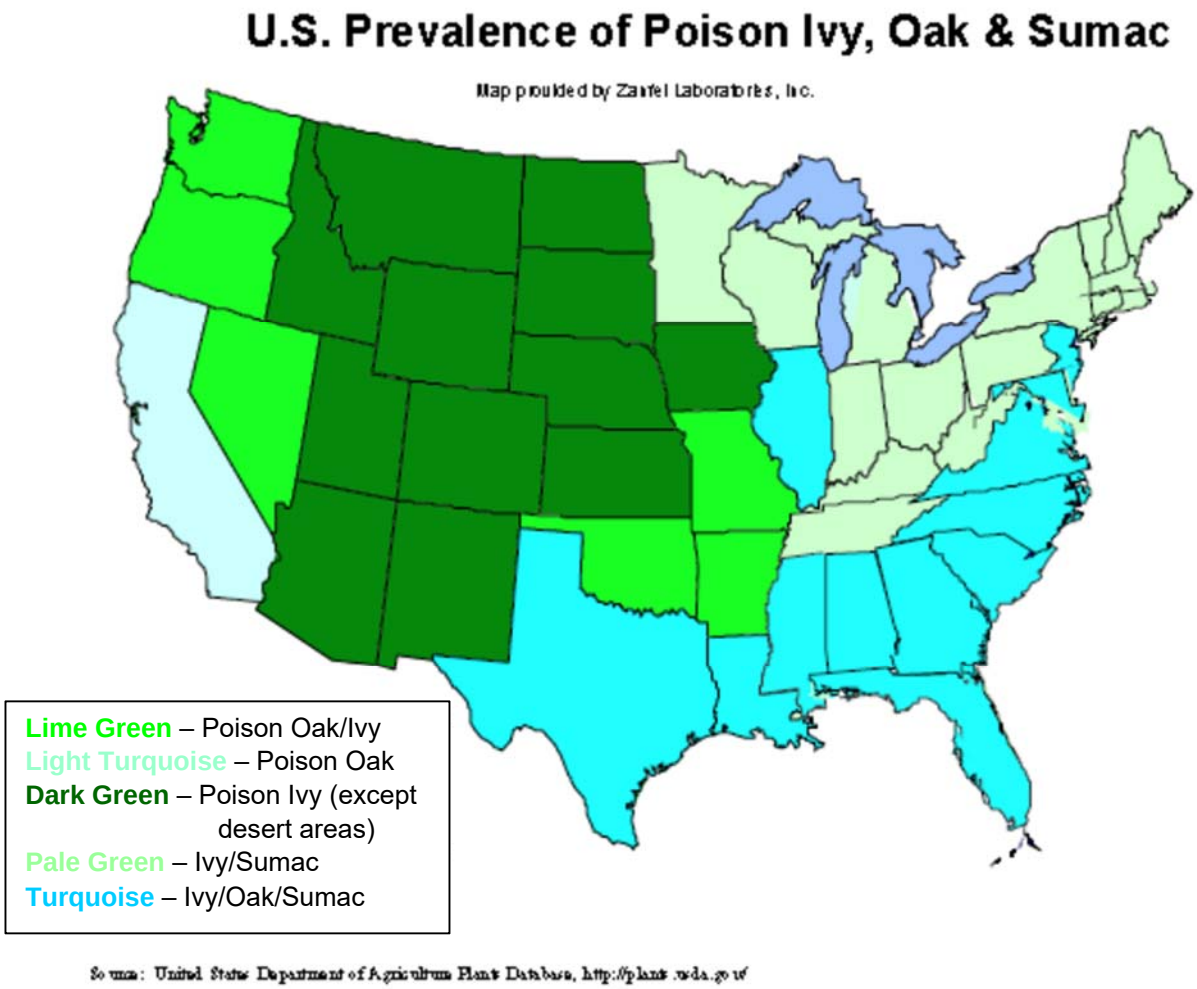
Poison oak can be present as a sparsely-branched shrub. Poison oak can grow anywhere in the United States with the exception of Hawaii, Alaska, and some southwest areas that have desert climates. Poison oak is similar to poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches.

Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety “down.” Poison sumac has white, “hairy” berry clusters. Poison sumac grows exclusively in very wet or flooded soils, usually in swamps and peat bogs, in the eastern United States.

Poison Ivy

Poison Oak

Poison Sumac



To prevent exposure to these poisonous plants:

- Wear proper PPE, including long sleeves, long pants, boots, and gloves.
- Barrier skin creams, such as lotion containing bentoquatum (Tecnu®), may offer some protection prevent the occurrence of exposure symptoms.
- Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. Employees with known allergies should identify themselves to the SSO or Project Manager prior to starting field work as a precautionary measure. If you believe you have contacted one of these plants:
    - Immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.
    - Contact the People and Safety Team and Project Manager immediately after caring for affected skin.

- Wash exposed clothing separately in hot water with detergent.

- After use, clean tools, and soles of boots with rubbing alcohol or soap and lots of water. Urushiol can remain active on the surface of objects for up to 5 years.
- If a rash occurs, contact the People and Safety Team and complete and submit an Incident Report Form. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

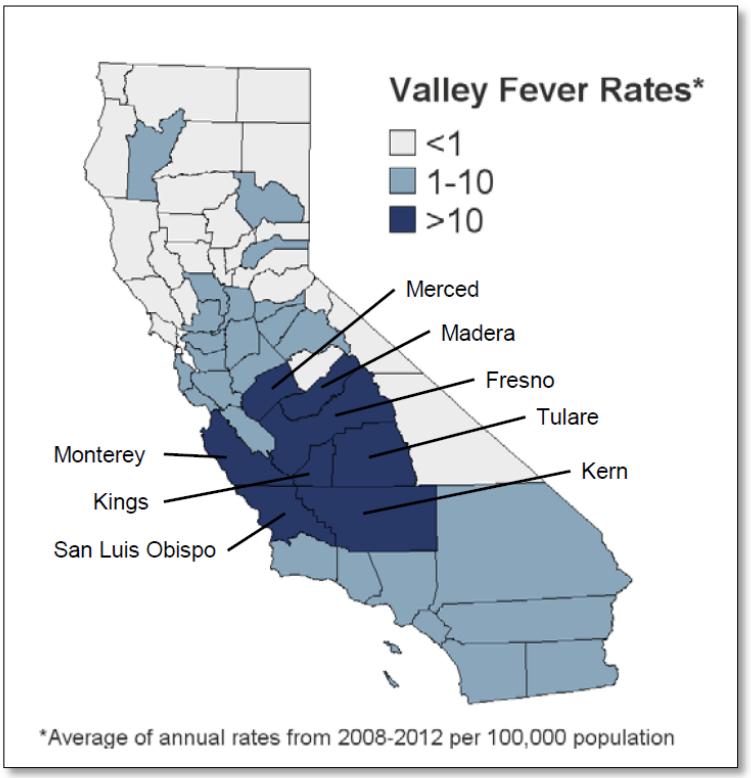
1.7 Sewage and Bacterial Impacted Sediments

Some project work may be conducted at sites that serve or have served as a combined sewer overflow and consequently may have received untreated sanitary sewage from numerous sources. Decomposed sewage can potentially be encountered within sites and their sediments. Sediments could contain soil and marine microorganisms, and bacterium associated with sewage. Many of these bacterium can cause illness through ingestion, direct contact, or the inhalation of a bio-aerosol possibly in the form of dust. Potential respiratory exposure to biological agents can also occur through the inhalation of aerosols produced during sediment handling activities. PPE as identified in the site-specific HASP will be worn to minimize potential exposures. Employees will follow the decontamination or disposal procedures identified in the HASP.

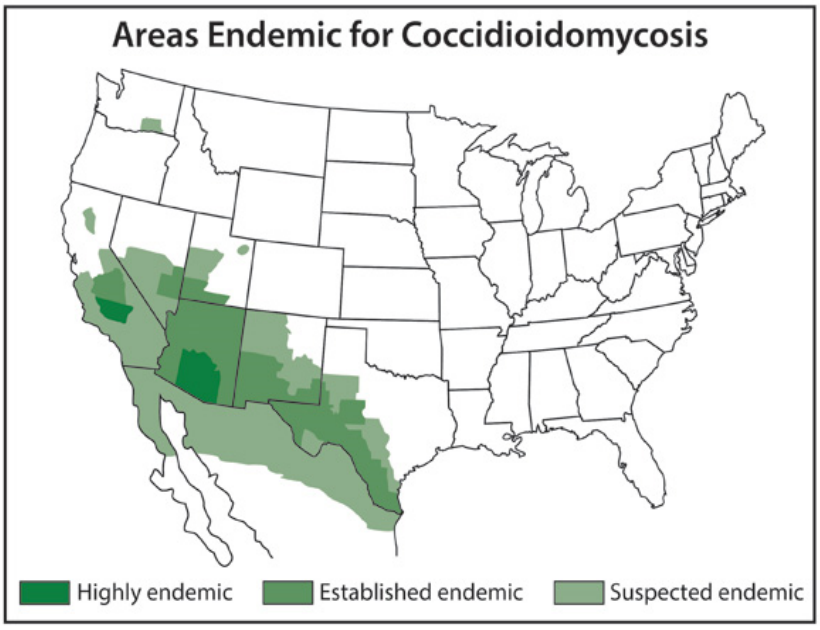
1.7.1 Fungal Spores in Soil – Valley Fever

Valley Fever is an illness that usually affects the lungs. It is caused by the fungus *Coccidioides immitis* that lives in the top 2 to 12 inches of soil in many parts of California. When fungal spores are present, any work activity that disturbs the soil, such as digging, grading, or other earth moving operations, or vehicle operation on dirt roads, can cause the spores to become airborne, therefore increasing the risk of Valley Fever. All employees on sites where the fungus is present, and who are exposed to dusty conditions and wind-blown dusts are at increased risk of becoming infected.

Valley Fever fungal spores are too small to be seen, and there is no reliable way to test the soil for spores before working in a particular place. Valley Fever can be found throughout the southwestern United States, parts of Mexico, and South America. Some California counties consistently have Valley Fever fungus present in the soil. In these regions Valley Fever is considered endemic. Health departments track the number of cases of Valley Fever illness that occur. This information is used to map illness rates as seen on the figures below from the Center of Disease Control Valley Fever Awareness website.



Rates of reported Valley Fever cases in California counties from 2008–2012. Darkest colored counties had the highest rates of Valley Fever.



When present, symptoms usually occur between 7 to 21 days after breathing in spores, and can include:

- Cough
- Fever
- Chest pain
- Headache
- Muscle aches
- Rash on upper trunk or extremities
- Joint pain in the knees or ankles
- Fatigue

Symptoms of Valley Fever can be mistaken for other diseases such as the flu (influenza) and TB (tuberculosis), so it is important for employees to obtain medical care for an accurate diagnosis and possible treatment.

While there is no vaccine to prevent Valley Fever, the following important steps must be taken in order to limit risk:

- Determine if the worksite is in an endemic area. Contact the local health department for more information about the risk in the county GEI is performing work that may disturb soils.
- Prepare work plans and work practices that reduce employee's exposure, which may include:
    - Provide air conditioned cabs with properly maintained dust filters for vehicles that generate heavy dust and make sure employees keep windows and vents closed.
    - Suspend work during heavy winds.
- When exposure to dust is unavoidable, National Institute for Occupational Safety and Health (NIOSH)-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or High Efficiency Particulate Air (HEPA) must be provided. The Project Manager must work with the Safety Team to develop and implement a respiratory protection program in accordance with California's Occupational Safety and Health Administration (Cal/OSHA's) Respiratory Protection standard (8 CCR 5144) for the project.
- Take measures to reduce transporting spores offsite, such as:
    - Clean tools, equipment, PPE, and vehicles before transporting offsite.
    - If employee's clothing is likely to be heavily contaminated with dust, provide coveralls and change rooms, and showers where possible.

1.8 Injury Reporting

If a GEI employee suffers an injury, bite, or sting on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.10 References

http://www.cdc.gov/ncidod/dvbid/westnile/index.htm
http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm
http://www.epa.gov/pesticides/health/mosquitoes/insectrp.htm
http://www.cdc.gov/niosh/topics/lyme/
Protecting Yourself from Ticks and Mosquitoes, NIOSH Fast Facts, Publication No. 2010-119
http://npic.orst.edu/pest/mosquito/ptc.html
http://www.cdc.gov/features/valley-fever-10-things/
https://www.cdph.ca.gov/HealthInfo/discond/Documents/VFGeneral.pdf
https://blog.epa.gov/blog/tag/mosquitoes/

1.11 Attachments

None

1.12 Contact

Health&SafetyTeam@geiconsultants.com

1.13 Review History

- June 2016
- June 2014
- November 2013
- October 2010

STANDARD OPERATING PROCEDURES

SOP No. HS-002 Infectious Materials and Bloodborne Pathogens Exposure Control Plan

1.1 Objective

GEI personnel may come in contact with potentially infectious agents (materials) when performing first aid or cardiopulmonary resuscitation (CPR). Employees may also come into contact with these agents when working at certain contaminated sites (i.e., urban sites, discarded contaminated needles, or sewer outfall exposures). This standard operating procedure (SOP) has been developed to minimize the potential for exposure to employees who may contact, directly or indirectly, infectious agents.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with infectious materials and bloodborne pathogens. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with infectious materials or bloodborne pathogens and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

Universal Precautions (i.e., treat all potentially infectious materials as if it were infected) will be used by GEI employees.

1.3 Exposure Control Plan

1.3.1 Standard Procedures

Sampling of potentially infectious materials will be performed in a manner that minimizes the potential for creating splashes, droplets, or aerosols. Mechanical pipetting devices will be used for manipulating sanitary sewer effluent. Mouth pipetting is prohibited.

The use of glassware or equipment with sharp or pointed edges will be kept at a minimum to reduce the potential of injury that would create a direct route of entry into the body for infectious materials.

Minor cuts, scratches, or other breaks in the skin barrier will be covered prior to the handling of infectious materials. Employees experiencing exudative lesions or weeping dermatitis will refrain from direct contact with infectious materials.

Eating, drinking, smoking, or application of cosmetics is not permitted in areas where potentially infectious materials are handled or sampled.

Employees will wash and disinfect their hands, face, or other potentially contaminated skin surfaces upon completing the handling of infectious or potentially infectious agents or after rendering first aid.

1.3.2 Personal Protective Equipment

Personal Protective Equipment (PPE) will be worn to reduce the potential of exposures to splashes or aerosols. At a minimum, PPE will include safety glasses and appropriate gloves, but may also require the use of face, respiratory, foot, and full-body protection. Refer to the site-specific HASP for specific PPE requirements.

Disposable PPE used in the handling or sampling of infectious materials will be appropriately disposed of and not reused.

1.3.3 Medical Monitoring

Medical monitoring is required for an employee when a potential workplace exposure has occurred. The employee must follow the GEI Incident Reporting procedures regarding the potential exposure as soon as possible. For infectious agents in which a medically accepted vaccination has been developed (e.g., hepatitis B virus) (HBV) potentially exposed employees will be given the option to receive an inoculation at no cost. Employees who have been exposed will be given the option to receive a confidential medical evaluation also at no cost. Required records for exposed employees will be kept confidential.

1.3.4 Training

Employees with a reasonable risk for exposure must complete Bloodborne Pathogen training covering the following topics:

- An explanation of the Occupational Health and Safety Administration (OSHA) bloodborne pathogen standard.
- A general explanation of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne diseases.
- An explanation of the GEI's Bloodborne Pathogen SOP and exposure control plan.
- Appropriate methods for recognizing tasks that involve potential exposure.
- An explanation of the use and limitations of methods to prevent exposure.
- Proper types, use, handling, decontamination, and disposal of PPE.
- The availability of HBV vaccines and the procedures for obtaining a vaccination.
- Appropriate actions to take during an emergency involving bloodborne pathogens.
- Post-exposure procedures.
- An explanation of required signs and labels.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.6 Attachment

None

1.7 Reference

OSHA 29 CFR 1910.1030 – Bloodborne Pathogens

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- June 2016
- June 2014
- November 2013
- January 2011
- November 2010

STANDARD OPERATING PROCEDURE
HS-004 Driver Safety

1.1 Objective

GEI has implemented a Safe Driving Program to encourage safe driving habits and promote the ongoing safety of our staff and the communities where we work. For more information, refer to the Operation of Vehicles section of GEI's Employee Handbook.

This Standard Operating Procedure (SOP) provides requirements and recommendations to minimize the potential risks while operating or riding in a motor vehicle.

1.2 General

GEI employees will adhere to the following requirements when operating a vehicle while conducting business on behalf of GEI. These requirements apply to GEI-owned, rental, and personal vehicles used to conduct GEI business:

- Employees must maintain a valid and current driver's license.
- Employees using a personal vehicle for work-related travel must have proper insurance coverage that meets the requirements in the state in which they reside.
- Employees must wear their safety belt while in a moving vehicle.
- Vehicle incidents will be reported in accordance with GEI's Incident Reporting procedures (*refer to* GEI's Safety App for smart phones or the Safety page on the GEI intranet.).
- Vehicles will be properly maintained and safely operated (*refer to* GEI's Fleet Maintenance Program).
- Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction. Employees should not exceed the posted speed limit and should maintain a safe distance between other vehicles.
- When parking a vehicle at a job site, the employee should position the vehicle in a manner which reduces or eliminates the need to operate the vehicle in reverse. It is recommended, a safety cone should be placed at the rear of the vehicle after parking the vehicle and be removed prior to moving the vehicle. This precautionary measure makes the employee aware of other vehicles, equipment, and structures within the backup radius of the vehicle.

When driving an unfamiliar vehicle (rental or GEI-owned), it is the driver's responsibility to orient themselves to the vehicle by:

- Walking around the vehicle to observe the condition of the vehicle and hazards that could be within the travel path.
- Becoming familiar with the size of the vehicle.
- Note if the vehicle has anti-lock braking system (ABS[1]).
- Adjusting mirrors (rear and side).
- Adjust seats to be situated as far back as safely practical, away from the air bag, located in the steering wheel.
- Becoming familiar with dashboard, center console, and steering controls.
- Locating the turn signals, windshield wipers, lights, emergency flashers, and the heating, air conditioning, and defrost controls.

1.3 Driving Defensively

Driving defensively means not only taking responsibility for oneself and actions but also keeping an eye on "the other guy." Good defensive drivers may be able to anticipate what the other driver will do next. GEI recommends the following guidelines to help reduce risks while driving:

- Do not start the vehicle until each passenger and any belongings are secured in the vehicle.
- Remember that driving above or below the speed limit can increase the likelihood of a collision.
- Be aware of impaired drivers; if a car is straddling the center line, weaving, making wide turns, stopping abruptly, or responding slowly to traffic signals, the driver may be impaired or using a cellular telephone. Avoid an impaired driver by turning right at the nearest corner or exiting at the nearest exit.
    - If it appears that an oncoming car is crossing into your lane, pull over to the roadside, sound the horn, and flash the headlights.
    - If an unsafe or suspicious driver is observed, notify the police.
- Follow the rules of the road. Do not contest the "right of way" or try to race another car during a merge. Always be respectful of other motorists.

[1] ABS is a mechanism that allows the wheels on a vehicle to maintain contact with the surface of the road, based on inputs from the driver (braking), to prevent the wheels from locking up (ceasing rotation) and to avoid an uncontrolled skid.

- Allow large vehicles, including tractor trailers, extra breaking distance, turning radius, and avoid traveling in the other driver's blind spots.
- Do not follow too closely. GEI employees should use a minimum of "3-second following distance."
- While driving, be cautious, aware, and responsible.
- Use extra caution, observe road signs, and reduce speed in construction areas and school zones.
- Always be aware of pedestrians, bicyclists, and motorcyclists.

1.4 Cellular Phone Use and Other Distractions

Refer to the *Portable Communication Device Use While Driving* section of the GEI Employee Handbook for GEI's policy on the use of cellular telephones while operating a vehicle.

1.5 Drugs and Alcohol

The use of illegal drugs or alcohol is prohibited when driving a vehicle on GEI business. Be aware of the side effects of prescription and over-the-counter medications which can impair an employee's ability to drive.

1.6 Adverse Driving Conditions

When operating a vehicle, its possible adverse driving conditions may be encountered. Below is a list of possible conditions and how they can be mitigated.

1.6.1 Driving at Night

Vision maybe limited at night due to impairment of the driver's depth perception, color recognition, and peripheral vision. Another factor adding danger to night or early morning driving is fatigue. Drowsiness makes driving more difficult by dulling concentration and slowing reaction time. Effective measures to minimize these hazards by preparing the car and following guidelines:

- Check the headlights to ensure they are properly aimed. If you notice the headlights are not properly aimed, report it to the Branch Manager, or if applicable the rental car agent. Misaimed headlights blind other drivers and reduce the driver's ability to see the road.
- In addition to the known hazards of consuming alcohol prior to driving, night driving can potentially be affected because the recovery rate of glare from headlights is prolonged. Thus reducing your ability to see.

- Smoking in GEI vehicles and rentals is not permitted. When driving a personal vehicle for business, avoid smoking while driving. Nicotine and carbon monoxide may hamper night vision.
- Observe driving safety as soon as the sun goes down. Twilight is one of the most difficult times to drive, because the eyes' pupils are constantly changing to adapt to the growing darkness Always use headlights at dusk and at dawn; lights will not help the driver see better in early twilight, but they will make it easier for other drivers to see your car. Drive at a speed that allows you to see the road that is within the headlights span. Driving in a manner that prevents you from seeing hazards as they are illuminated is known as overdriving the headlights; it may be necessary for the driver to reduce speed to be prepared to brake within the illuminated area of the headlights.
- If an oncoming vehicle does not lower beams from high to low, avoid glare by watching the right edge of the road and using it as a steering guide.
- The driver should make frequent stops for light snacks and exercise. If the driver is too tired to drive, stop in a safe area and get some rest.

1.6.2 Snow/Freezing Conditions

When snow and ice are present, be prepared by following these winter driving safety tips.

1.6.2.1 Prepare the Vehicle Before a Snowstorm

- Check under the hood and take a look at the vehicles cooling system. Make sure the vehicle contains adequate antifreeze and the hoses are in good condition.
- Test heaters and defrosters ahead of time to make sure they are in good working condition.
- Test the windshield wipers and check the condition of the wiper blades. If wipers leave streaks on the windshields, replace the blades at the next possible opportunity. Keep the receipt to expense the cost with GEI or with the car rental company.
- It is recommended that a windshield washer/antifreeze solution is used during winter conditions.
- Check the lights on the vehicle and periodically clear them of snow and dirt.
- Vehicle batteries need extra power in cold conditions. Make sure the battery's terminals are clean and cables are secure.
- Determine if the vehicle has a anti-lock brake (ABS) system.
- Keep the gas tank at least half-full in the winter to help avoid gas line freeze up.

1.6.2.2 Driving During and After a Snowstorm

- Wear sunglasses to aid in limiting reflection from snow.
- Be aware of blind spots created by snow banks.
- Be extra cautious of pedestrians and other vehicles in intersections.
- Allow extra time for braking and increase the distance between your car and the car immediately in front of the car.
- Reduce speed and do not exceed the posted limit.
- If the tires starts to lose traction, remove the foot off the gas and gradually reduce speed. Accelerate slowly once traction is regained.
- If the vehicle starts to skid, and does not have anti-lock brakes, steer into the skid. This will bring the back end of the car in line with the front. Avoid using the brakes. If the vehicle does have anti-lock brakes, firmly brake as you steer into the skid.

1.6.3 Driving In the Rain

To prevent losing control of the car on wet pavement, take these preventive measures.

- Prevent skids by driving slowly and carefully, especially on curves.
- Steer and brake with a light touch.
- When necessary to stop or slow, do not brake hard or lock the wheels.
- Maintain mild pressure on the brake pedal.

Skidding
If the car begins to skid, ease the foot off the gas, and carefully steer the car in the direction you want the front of the car to go. For cars without anti-lock brakes, avoid using the brakes. This procedure, known as “steering into the skid,” will bring the back end of the car in line with the front. If the car has anti-lock brake systems (ABS), brake firmly as you steer into the skid.

Hydroplanning
Hydroplaning happens when the water in front of the tires builds up faster than the car’s weight can push it out of the way. The water pressure causes the car to lose contact with the road surface and slide on a thin layer of water between the tires and the road. At this point, the car can be completely out of contact with the road, making it possible for the driver to skid or drift out of the lane, or even off the road.

To avoid hydroplaning, keep the tires properly inflated and maintain good tread on the tires. If tires need to be replaced on a company vehicle, notify the branch manager or their designee. Slow down when roads are wet, and stay away from puddles. Try to drive in the tire tracks left by the cars in front of the vehicle. If the car begins to hydroplane, do not brake or turn suddenly. This could throw the car into a skid. Ease the foot off the gas until the car slows; accelerate slowly once traction is regained. If braking is needed, do so gently with light pumping actions. If the car has ABS, brake normally; the car's computer will mimic a pumping action, as necessary.

If weather conditions worsen to the point where the driver is not comfortable driving, pull the vehicle over to a safe location until conditions improve. Do not drive during severe weather conditions. Do not attempt to drive on roads with standing water or that have been flooded. Find an alternate route if these conditions exist.

1.6.4 Off Road

If operation of a vehicle is required off public or private roads or in situations where four-wheel-drive vehicles are required, the appropriate vehicle for the situation will be used.

Be sure any gear or equipment is secured inside the vehicle so it doesn't bounce around while the vehicle is off-road.

- Know the underside of the vehicle. Look under the vehicle and learn where the lowest-hanging parts are located so they are not damaged.
- Scout tricky terrain on foot. Don't hesitate to get out of the vehicle to examine, up close, the terrain and soil conditions. And be sure to scout out what's on the other side of a hill ahead of time so there are no surprises.
- Drive cautiously. Drive, "as slow as possible, as fast as necessary." Remember to use the gears to efficiently manage engine power, braking, and torque.
- Create a mental picture. Look ahead and visualize the paths to the vehicle will travel. Follow those paths.
- Drive straight up and down hills. Avoid diagonal lines that put the vehicle in a situation where it might roll.

1.7 Driver Training

GEI employees are required to complete driver safety training every 3 years. This training is managed by the People Team and will be assigned through GEI's e-learning provider.

1.8 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on GEI's Safety App (for smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP.

1.10 References

National Safety Council
Oklahoma Safety Council
GEI Consultants, Inc. Employee Handbook

1.11 Attachments

None

1.12 Contact

Health&Safetyteam@geiconsultants.com

1.13 Review History

- November 2016
- May 2014
- November 2013
- January 2011

STANDARD OPERATING PROCEDURES

SOP No. HS-008a Non-Powered Hand Tools

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees working with non-powered hand tools. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the hazards associated with the non-powered hand tools that will be used. These hazards should be reviewed during the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Misuse of hand tools accounts for the majority of accidents and injuries involving hand tools. Only use a tool for the task which it was designed for. If the right tool isn't available contact the Project Manager and discuss what is needed. Improper maintenance is another leading cause of injuries. Employees using hand tools may be exposed to a number of other potentially serious hazards: falling objects (i.e., objects can fall as a result of contact with tools or objects which are abrasive or splash), harmful dust, fumes mists, vapors, and gases, as well as contact with electrical power sources.

1.2.1 Condition of Tools

All hand tools, whether furnished by GEI or the employee, will be maintained in safe working condition. All hand tools must be inspected before use. Never use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose. Never use impact tools such as hammers, chisels, punches or steel stakes having mushroomed (flattened) heads. Tag worn, damaged or defective tools "Out of Service" and do not use them; notify your Branch Manager or Project Manager so that the tool can be replaced or repaired. If the tools cannot be repaired they will be disposed of properly. GEI does not issue or permit the use of unsafe hand tools.

1.2.2 Personal Protective Equipment

Employees using hand tools will be provided with the personal protective equipment (PPE) necessary to protect them from the hazard of the tool as well as the associated hazards with using the tool. (i.e., projectile debris, dust, etc.). All employees will wear work gloves, steel toe or composite toe boots, and safety glasses at a minimum. In addition, face shields and hearing protection may be required. Most hand injures can be avoided with the proper use of PPE. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI's Corporate Health and Safety Program.

1.2.3 General Safe Practices

Never wear sandals, open-toed or canvas shoes when working with tools. Always tie back long hair. Avoid loose-fitting clothes which might become entangled in a tool. Always remove rings and other jewelry. Make sure your grip and footing are secure when using large tools. Never carry tools up ladders; use a tool belt, hoist, or a rope. Use extra caution when using tools at heights – a falling tool could kill a co-worker. Always pass a tool to another person by the handle – never toss it to them. Never use a tool with hands are wet, oily, or greasy. Select ergonomically-designed tools for work tasks when movements are repetitive and forceful. Always make sure observers are at a safe distance. Always secure work with a vice, clamp, or other support.

1.3 Non-Power Hand Tools

Non-powered hand tools include anything from axes to wrenches. Even though the tool is powered by human inertia, injuries from improper use of non-powered hand tools often involve severe disabilities.

1.3.1 Knives

Only use a knife with a sharpened blade. Pull the knife through the object and away from your body; pulling motions are easier to manage. Never use a knife if its handle has splinters, burrs, cracks, splits or if the blade is loose. Knives should never be used as screwdrivers, pry bars, or can openers. Never pick up knives by their blades. Always carry knives with their tips/points toward the floor. Never carry knives, scissors, or other sharp tools in pockets. Never attempt to catch a falling knife. When not in use, knives should be stored in sheaths. Box cutters will be self-retracting.

1.3.2 Wrenches

Never use wrenches that are bent, cracked, badly chipped, or having loose or broken handles. Discard any wrench with spread or battered jaws; if the handle is bent; or if a wrench has broken or battered points and notify your Branch Manager so that a replacement can be made. Never slip a pipe over a single head wrench handle to increase leverage. Never use a shim to make a wrench fit. Pull on a wrench using a slow, steady motion. Do not use push force on a wrench; you could lose your balance if the wrench slips.

1.3.3 Screwdrivers

Always match the size and type of screwdriver blade to fit the head of the screw. Do not hold the work piece against your body while using a screwdriver. Never put your fingers near the tip of a screwdriver when tightening a screw. Never use a screwdriver to make a starting hole for screws. Never use a screwdriver as a chisel, pry bar, or nail puller. When performing electrical work, always use an insulated screwdriver. Never use a screwdriver to test the charge of a battery.

1.3.4 Hammers

Never use a hammer if your hands are oily, greasy or wet. Always check behind you before swinging a hammer. Use a claw hammer for pulling nails. Never strike nails or other objects with the "cheek" of the hammer. Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer. Never strike one hammer against another hammer. Never use a hammer as a wedge or a pry bar.

1.3.5 Pliers

Never use pliers which are cracked, broken, or sprung. Never use pliers as a wrench or a hammer. Do not attempt to force pliers by using a hammer on them. Never slip a pipe over the handles of pliers to increase leverage. When performing electrical work, always use insulated pliers. When using diagonal cutting pliers, shield loose pieces of cut material from flying into the air by using a cloth or your gloved hand.

1.3.6 Snips

Never use snips as a hammer, screwdriver, or pry bar. Always wear safety glasses or safety goggles when using snips to cut materials. Always wear work gloves when cutting materials with snips. Keep the blade aligned by tightening the nut and bolt of the snips. Never use straight cut snips to cut curves. Always use the locking clip on the snips when you have finished using them. Never leave or store snips in the open position.

1.3.7 Hand Saws

Always keep handsaws sharp and free of rust to prevent them from binding or jumping. Never carry a saw by the blade. Always hold the work piece firmly against a work table. Keep control of saws by releasing downward pressure at the end of the stroke. Never use an adjustable blade saw such as a hacksaw, coping saw, keyhole saw, or bow saw, if the blade is not taut. Oil saw blades after each use. Never force the saw through the cut as this may cause the saw to buckle or fly out of the groove and cause injury.

1.3.8 Chisels

Only use sharpened chisels. Never use chisels having mushroomed (flattened) striking heads. Whenever possible, hold a chisel by using a tool holder. Clamp small work pieces in a vise and chip towards the stationary jaw of the vise. Chip or cut away from yourself and keep both hands in back of the cutting edge. Always wear safety glasses or a face shield.

1.3.9 Vise and Clamps

Never use a vise having worn or broken jaw inserts, or having cracks or fractures in the body of the vise. Position the work piece in the vise so the entire face of the jaw supports the work piece. When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand or saw horse. Never slip a pipe over the handle of a vise to increase leverage. Never use a C-clamp for hoisting materials. Never use a C-clamp as a permanent fastening device.

1.3.10 Jacks

A manufacture's rated capacity must be clearly marked on all jacks and all jacks must have a stop indicator. When using a jack, never exceed the capacity of the stop indicator. Jacks should be lubricated and inspected regularly. When setting up a jack, ensure the base is centered on a firm, level surface. The jack head should also be placed against a level surface. Lift force should be applied evenly. Put a block under the base of the jack when the foundation is not firm. If it seems likely the cap could slip, place a block between the jack cap and load. Immediately block the load after it is lifted.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or supervisor/project manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP or in the manufacturer's specifications. Appropriate PPE must be worn correctly to provide the intended level of protection. If a hand tool is being used that is not identified in this SOP consult the manufacturer's literature and contact the Safety Team so we can include the information in a future version of this SOP.

1.6 References

OSHA Standards for the Construction Industry, Subpart I
Risk Analytics, LLC Hand Tools Training, 2006

1.7 Attachments

None

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- July 2016
- May 2014
- August 2011
- October 2010
- One revision date unable to be found

STANDARD OPERATING PROCEDURES
SOP No. HS-010 Inclement Weather

1.1 Objective
This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with the potential to be affected by inclement weather. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for working in inclement weather and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General
Employees should be aware of local weather conditions and monitor advisories issued by the National Weather Service and other local reporting services. Depending on location and season, storms are capable of producing heavy rain, floods, extreme temperatures, high wind conditions, lighting, tornados, and/or snowfall.

1.2.1 Heavy Rain
If working or driving in a rain storm, use extreme caution. When driving, turn your low beam lights on when the rainfall becomes heavy. Employees should be aware of the following:

- Heavy rain decreases visibility, especially when driving.
- Surfaces and tools become slippery.
- If you are working in the rain and your clothes become wet there is a risk of hypothermia when exposed to winds, even in warm temperatures.
- If the storms are going to produce thunder and/or lightning, leave the work area immediately and move to a safe area.
- Use your best judgment to determine if the rainfall becomes too heavy to continue working safely.

1.2.2 Lightning
Lightning can strike as far as 10 miles from the area where it is raining. That's approximately the distance you can hear thunder. **If you can hear thunder, you are within striking distance. Seek safe shelter immediately.** This can be within a building or vehicle. Wait 30 minutes after the last clap of thunder or flash of lightning before going outside again.

1.2.3 Flooding

Flooding may occur as a result of heavy rain in a short period of time. Flooding can be particularly acute in canyon areas where dry creek beds can turn into raging rivers from rainfall in distant or higher elevation areas. Be aware of this and your surroundings and move to a safe place if you begin to see signs that flooding may occur. Signs of potential flooding include sudden appearance of water in dry creek beds, increased water flow in rivers or streams, or quick rise in water levels.

Do not attempt to drive through areas or streets that are flooded. Seek alternate routes. Be particularly cautious at night when flooded areas are difficult to see. Urban flooding can stop traffic; increase the potential for traffic accidents; and can trap people in vehicles.

1.2.4 Extreme Temperatures

Work activities may take place in extreme heat or cold. Be prepared if these conditions are anticipated. Have the appropriate personal protective equipment (PPE) available; exercise proper fluid intake; and take breaks to prevent heat and cold stress. For more information about these conditions see the heat stress and cold stress programs found in GEI's Health and Safety Program.

1.2.5 High Winds, Tropical Storms, and Tornados

High Winds can be extremely dangerous. Appropriate measures will be taken to secure equipment and loose items when working in windy conditions. The project manager should be contacted about the weather conditions and, if necessary, work should be postponed.

Tropical storms are described as storms with sustained winds ranging from 39 to 73 miles per hour (mph) and hurricanes produce sustained winds that exceed 74 mph. When winds approach 40 mph (gale force winds) twigs begin to break off of trees and vehicles will veer off of the road. When winds approach 40 mph or the GEI employee feels unsafe based on the activities being performed, stop work and seek shelter as soon as possible. Blowing or falling debris and overhanging limbs/signs can be a significant hazard. If possible, avoid driving in these conditions; 70 percent of injuries during hurricanes are a result of vehicle accidents. Note that tall or elevated equipment will have manufacturer's safe operating wind speeds defined that could be less than 40 mph. The operator's manual should be consulted prior to operation of the equipment.

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. The Fujita Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure. Based on the Fujita Scale, or F-Scale, numbers begin at F0: 40-72 mph and go to F6: 319-379 mph (F6 is

generally theoretical). Nearly three-fourths of tornados are on the weak F0-F1 scale with just over two-thirds of deaths resulting from the violent F4-F5 tornados.

If a tornado is seen, stop work and seek shelter immediately. If a tornado siren is sounded move immediately to safety indoors and then move to a windowless interior space, basement, stairwell, or designated fall-out shelter. Windows should not be opened before an oncoming tornado. If there is no shelter available, seat belt yourself into your stationary vehicle or seek a depression or low spot on the land surface.

1.2.6 Snowfall and Ice Conditions

Working in the winter months may result in activities taking place during periods of snowfall or icy conditions. If you are working during or after snow has fallen, dress appropriately for the conditions. Snow and ice can cause working surfaces to become slippery. Clear snow and ice from work areas to prevent slip hazards. Use caution when performing snow or ice removal activities to prevent injuries. Driving in snowy and icy conditions is also hazardous. Reduce speed and use caution if you must drive in these conditions.

If the weather conditions deteriorate and you do not feel safe working in these conditions, stop work, move to a safe indoor location, and contact your project manager to let them know the weather, work conditions, and your location.

1.3 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.4 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection. Protection in extreme weather conditions can best be accomplished if the conditions are anticipated and actions are taken. Monitor local weather conditions prior to starting work.

1.5 References

Center for Disease Control and Prevention – Natural Disasters and Severe Weather
http://www.bt.cdc.gov/disasters/

National Lightning Safety Institute

NOAA, National Weather Service

Office of Climate, Water, and Weather Services

1.6 Attachment

None

1.7 Contact

Safety Team
Health&SafetyTeam@geiconsultants.com

1.8 Review History

- Previous revision dates were not documented
- May 2014
- July 2016

STANDARD OPERATING PROCEDURES

SOP No. HS-012 Noise Exposures

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with elevation noise levels. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for work in loud environments and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Working in loud environments can cause hearing damage and loss if the proper protection is not in place. The following procedures describe methods to mitigate unhealthy noise levels and protect hearing.

1.3 Hazard Identification

If projects involve noise levels above OSHA regulations, employees should take steps to remove the noise exposure. Common sources of elevated noise levels are heavy equipment, power tools, pumps, and generators. GEI has an established Hearing Conservation Program located in the GEI Health and Safety Program.

1.4 Risk Identification

Hearing protection is required if noise levels in a work area are known to be above 85 decibels (dB), which can be measured with a noise meter. When decibel levels are not known, hearing protection is required if you need to raise your voice to talk to someone standing within a normal speaking distance from you.

1.5 Mitigation

There are three options that can be used to help mitigate a noise hazard:

1.) Remove the hazard by taking away the source of the noise.

2.) Remove the employee from the source of the noise.

3.) Provide the employee with appropriate personal protective equipment (PPE).

The first option for employee protection is to remove the hazard by taking away the source of the noise or using engineering controls to reduce the level.

If this cannot be accomplished, the next control measure is to remove the employee from the source. This can be done by moving the work area to a quieter location or distancing the employee from the noise source. For example, GEI employees do not need to be standing next to an operating drill rig or other heavy equipment. By distancing themselves from heavy equipment or other noise sources the need for hearing protection can be eliminated/reduced.

The final option, if the above two options aren't feasible, disposable ear plugs that are made available to GEI employees are to be used. Additional means of hearing protection will be provided, such as ear muffs, if the disposable ear plugs are not adequate.

When using hearing protection, employees will need to make a greater effort to be aware of the surroundings which may include moving equipment, traffic, and other site hazards.

1.6 Proper Use of Hearing Protection

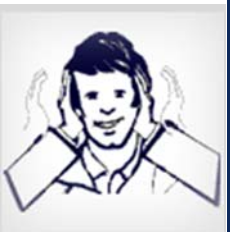
DISPOSABLE EAR PLUG FITTING INSTRUCTIONS

Before fitting any ear plugs, make sure your hands are clean.
Foam ear plugs are disposable and not intended for reuse.

Hold the ear plug between your thumb and forefinger. Roll and compress the entire ear plug to a small, crease-free cylinder. While still rolling, use your other hand to reach over your head and pull up and back on your outer ear. This straightens the ear canal, making way for a snug fit.

Insert the ear plug and hold for 20 to 30 seconds. This allows the ear plug to expand and fill your ear canal.

Test the fit. In a noisy environment, and with earplugs inserted, cup both hands over your ears and release. You should not notice a significant difference in the noise level. If the noise seems to lessen when your hands are cupped over your ears, your ear plugs are not fitted properly. Carefully remove the earplugs (see instructions below) and refit following instructions, above.



Always remove ear plugs slowly, twisting them to break the seal. If you remove them too quickly, you could damage your ear drum.	

REUSABLE EAR PLUG FITTING INSTRUCTIONS

Before fitting any ear plugs, make sure your hands are clean.

Reusable ear plugs should be inspected and cleaned often in soapy water. If they become hard, torn, or deformed they should be discarded and replaced.

Reach around your head and pull up and back on your outer ear. This straightens out the ear canal, making way for a snug fit. Hold the stem end of the ear plug and insert it well inside your ear canal until you feel it sealing and the fit is comfortable.	
Test the fit. In a noisy environment, and with ear plugs inserted, cup both hands over your ears and release. You should not notice a significant difference in the noise level. If the noise seems to lessen when your hands are cupped over your ears, your ear plugs are not fitted properly. Carefully remove the ear plugs (see instructions below) and refit following instructions, above.	
Always remove ear plugs slowly, twisting them to break the seal. If you remove them too quickly, you could damage your ear drum.	

1.7 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety

Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, People Team, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.9 References

OHSA 29 CFR 1910.95 – Occupational Noise Exposure

OHSA 29 CFR 1926.101 – Hearing Protection

Texas American Safety Company (TASCO)

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- June 2016
- May 2014
- November 2013
- February 2011
- November 2010

STANDARD OPERATING PROCEDURE
SOP HS-014 Utility Mark-out

1.1 Objective
This Standard Operating Procedure (SOP) provides guidance for utility mark-out procedures related to drilling, excavation, or other sub-surface or intrusive activities to avoid injury to GEI employees or property damage. This SOP is applicable when GEI is responsible for its operation or our subcontractor's operation for utility mark-out. A utility mark out is when paint, flags or other markers are put in place to identify the location of an underground utility.

Clients or local agencies may have additional requirements or procedures to mark out of utilities. If local utility mark-out procedures differ from those described within this SOP, applicable state or municipal regulations should be followed.

1.2 General
This SOP is intended for use by employees engaged in work with sub-surface or intrusive activities. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for subsurface hazards and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2.1 Contractor/GEI Responsibilities

- The contractor or GEI employee will pinpoint each exploration area with white paint, flags, or stakes. personal protection equipment (PPE), including eye protection when using spray paint will be worn.
- Exploration locations should be marked-out with sample identification number(s) and type of sample (e.g., boring, test-pit, or monitoring well).
- The contractor compiles information about the work areas on a request form specified by the state utility mark-out program and submits it. Work area location maps can be sent to the utility mark-out program to clarify locations.
- The mark-out program customer service representative will provide a mark-out ticket number and a list of utilities notified upon receipt of the request information. This information will be recorded on the GEI documentation form in Appendix B and/or in other project documents.
- If known, the contractor or GEI employee will also notify non-member utility operators (e.g., apartment complexes, commercial complexes, railroads with communication cables, etc.).

1.2.2 Utility Mark Outs

- Utility companies or their sub-contractors will only mark-out, or clear, utilities under their responsibility. Generally, this means that they will only mark-out utilities within the public right-of-way up to private property boundaries. Information needed to determine the location of utilities on private properties will be requested from the property owner. This may include available property drawings or as-built figures. If this information is not available, additional non-intrusive surveys of the property may be required by a private utility locator to find underground utilities by using techniques such as ground penetrating radar (GPR).
- American Public Works Association (APWA) Uniform Color Code For Marking Underground Utility Lines are:
    1. **White** – Proposed Excavation
    2. **Pink** – Temporary Survey Markings
    3. **Red** – Electric Power Lines, Cables, Conduit and Lighting Cables
    4. **Yellow** – Gas, Oil, Steam, Petroleum, and Gaseous Material
    5. **Orange** – Communications, Alarm, Signal Lines, Cables or Conduit
    6. **Blue** – Water
    7. **Purple** – Radioactive Materials
    8. **Green** – Sanitary and Storm Sewers and Drain Lines

1.2.3 Utility Mark Out Review

- Before the intrusive work activities begin, the contractor or GEI employee will verify that each utility company has completed a utility location for the work area or the location has been cleared by a private locator and record this on the mark-out request information sheet.
- A visual survey of the project area will be done prior to the start of intrusive activities. This visual inspection will be done to identify signs, manholes, utility boxes, or other evidence of an underground utility is present and has been considered.
- The contractor or GEI employee can begin work on the scheduled work date and time if the utility operators have responded, taking care to find and preserve markings that have been made.
- Completed clearance documentation will be located on the excavation site during excavation activities and kept in project files.

1.2.4 Excavations

- When excavating near a buried utility, observe the approximate location around that utility.
- If exposing a utility, proper support and protection must be provided so that the utility will not be damaged.
- If the excavation work requires significant spans of the utility to be exposed, it is the contractor's responsibility to support the infrastructure (to prevent sagging or collapse) as needed. Contact the utility operator for support, guidance, or assistance.
- When the excavation is complete, provide proper backfill for utilities that have been exposed.
- Take care not to damage the conduit or protective coating of a utility. If the damage occurs, leave the damaged utility exposed and immediately call the utility owner.
- If a gas line is encountered, everyone will be evacuated according to the site evacuation procedures and the contractor must notify police, fire, and emergency personnel. No attempt should be made to tamper with or correct the damaged utility. All site personnel are to evacuate to the site's predetermined meeting point or a location a minimum of 300 feet away from the incident location.
- If the contractor needs to dig within the approximate location of a combustible, hazardous fluid, or gas line (natural gas, propane or gasoline), soft digging is required (hand digging, vacuum extraction) to a maximum depth of 5 feet. The approximate location is defined as 24 inches on either side of the designated center line of the utility if the diameter is not provided or 24 inches from each outside edge if the diameter is provided.

1.3 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification and/or the receipt of the Incident Report Form, RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.4 Limitations

- Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.
- Mark-out notification time usually does not include holidays. Make sure holidays are considered and mark-out time is scheduled accordingly. Under no circumstances are intrusive activities allowed to be performed prior to the required mark-out.
- Do not use white paint if precipitation is eminent. Consider using stakes if snow is predicted.

1.5 References

Reference the website for the "Call Before You Dig – 811" for the utility mark-out agency for the state you working in prior to site work. If you have issues locating the appropriate agency, contact the Safety Team for assistance.

1.6 Attachments

Attachment A – Standard Utility Color Codes

Attachment B – GEI Utility Clearance Documentation Form

1.7 Contact

Health&SafetyTeam@geiconsultants.com

1.8 Review History

- June 2016
- May 2014
- November 2013
- February 2011
- November 2010

ATTACHMENT A

COLOR CODE FOR UTILITY MARKING

(BASED ON 'THE AMERICAN PUBLIC WORKS ASSOCIATION' RECOMMENDATIONS AND THE ANSI STANDARD Z-53.1 FOR SAFETY COLORS)

UTILITY	COLOR
PROPOSED EXCAVATION	WHITE
ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES	RED
POTABLE WATER	BLUE
STEAM, CONDENSATE, GAS OR OIL COMPRESSED AIR	YELLOW
TELECOMMUNICATIONS, ALARM OR SIGNAL LINES, CABLES OR CONDUIT	ORANGE
TEMPORARY SURVEY MARKINGS	PINK
SEWER AND STORM DRAINS	GREEN
CHILLED WATER, RECLAIMED WATER, IRRIGATION AND SLURRY LINES	PURPLE
OTHER	LIGHT BLUE

ATTACHMENT B

Utility Clearance Documentation

Please print clearly. *For more room, use back of page.*

Client: _____

GEI Project Name & Number: _____

Site: _____

Excavation/Drilling Location ID: _____

Excavator/Driller: _____

GEI PM: _____ GEI Field Team Leader: _____

Utility Drawings Reviewed: _____

Provided By: _____ Reviewed By: _____

Utility Clearance Call Date: _____ Name of Utility: _____

Utility Clearance Call Date: _____ Name of Utility: _____

Utility Clearance Received from (utility & rep name): _____ Date: _____

Utility Clearance Received from (utility & rep name): _____ Date: _____

Company that completed clearance: _____ Date: _____

GEI Staff Responsible for Oversight: _____

Metal Detector Survey (yes/no): _____ Drilling Location Cleared by: _____

Contractor Name: _____ Company Name: _____

Contractor Signature: _____ Date: _____

GEI Staff Responsible for Oversight: _____

Private Location Clearance Required (yes/no): _____ Date: _____

Contractor Name: _____ Company Name: _____

Contractor Signature: _____ Date: _____

Methods used for utility location (i.e. GPR, electronic pipe location) _____

GEI Staff Responsible for Oversight: _____

Hand clearing Performed (yes/no): _____ Methods: _____ Date: _____

Contractor Name: _____ Company Name: _____

Contractor Signature: _____ Date: _____

GEI Staff Responsible for Oversight: _____

GEI Consultants, Inc. Representative (name & title): _____

GEI Consultants, Inc. Representative Signature: _____ Date: _____

Based upon the best available information, appropriate utility clearance procedures were performed for the invasive work specified. If client ordered site specific deviations from existing GEI utility clearance procedures, they are approved by the client signature below:

Client Representative (name & title): _____

Client Representative Signature: _____ Date: _____

Notes:

STANDARD OPERATING PROCEDURES

SOP No. HS-018 Working Around Heavy Equipment

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the physical hazards when working around heavy equipment.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for working near heavy equipment. The project site-specific health and safety plan (HASP) should include a hazard assessment for working near heavy equipment to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Heavy Equipment Precautions

Heavy equipment (e.g., excavators, backhoes, drill rigs, etc.), can present many physical hazards that can result in serious injury or death if the proper safety precautions are not followed. The following is a list of precautions to be aware of when working around heavy equipment:

- Wear appropriate personal protective equipment (PPE), including at a minimum reflective, high-visibility safety vest, hard hat, safety glasses, and steel/composite toe boots.
- Always keep your distance from moving equipment.
- Do not assume the operator knows where you are or where you are going.
- Make sure to make eye contact and receive acknowledgement of your presence with the operator.
- Avoid working near heavy equipment, but if unavoidable, communicate your location with the operators. If using hand signals, discuss the signals with the equipment operator prior to starting work.
- Watch for moving equipment. Construction sites can have a lot of activity and equipment may be moving in an unpredictable manner.
- Do not rely on back-up or other alarms. They may not be working or you may not hear them with the noise of other activities taking place in the area.
- Stay out of the swing radius of cranes, excavators, or other equipment that swings or rotates.
- Do not walk beside a moving vehicle, the vehicle may turn, slip, or the load may shift causing the vehicle to go off course.
- Do not ride on the outside of a moving equipment.

- Never walk under or stand too close to a load suspended by cranes or hoists.
- Do not walk behind a piece of equipment that is backing up without acknowledgment from the operator it is safe to proceed. If working next to heavy equipment is unavoidable, be aware of the hazards including pinch points and moving parts. Use a spotter to watch the work area for moving equipment.
- If necessary, ask the operator to stop equipment operation to perform your work tasks.
- Verify the location and operation of emergency shut-off devices on the equipment.
- Be aware of the fuels and chemicals associated with the equipment. Have a spill prevention and response plan in place that includes the appropriate containment materials (i.e., spill kit).
- Do not wear loose fitting clothing when working around moving equipment (i.e., drill rig augers).
- Do not operate heavy equipment.
- Do not use cellular telephones near operating equipment.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.6 References

OSHA 29 CFR 1926.600 – Subpart O; Motor Vehicles, Mechanized Equipment, and Marine Operations.

www.toolboxtopics.com/Construction/ (Viewed 10/16)

Caterpillar Safety – http://safety.cat.com/ (Viewed 10/16)

1.7 Attachments

None

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- October 2016
- May 2014
- November 2013
- August 2011
- October 2010

STANDARD OPERATING PROCEDURES

SOP No. HS-025 Manual Lifting

1.1 Objective

The purpose of this Standard Operating Procedure (SOP) is to identify and reduce potential work-related musculoskeletal disorder (WMSD) hazards. The SOP is intended to comply with state regulations and safe work practices developed by the Occupational Safety and Health Administration (OSHA). Modifications to meet these requirements will be made to this program as changing laws or regulations dictate.

1.2 General

Lifting heavy items is one of the leading causes of injury in the workplace. Overexertion and cumulative trauma when lifting are significant factors for injuries. When employees use smart lifting practices and work in their “power zone”, they are less likely to suffer from back sprains, muscle pulls, wrist/elbow/spinal and other injuries caused by lifting heavy objects. Common things to consider prior to lifting an object are: weight of the object, awkward postures, high-frequency and long duration lifting, inadequate handholds, and physical/environmental factors.

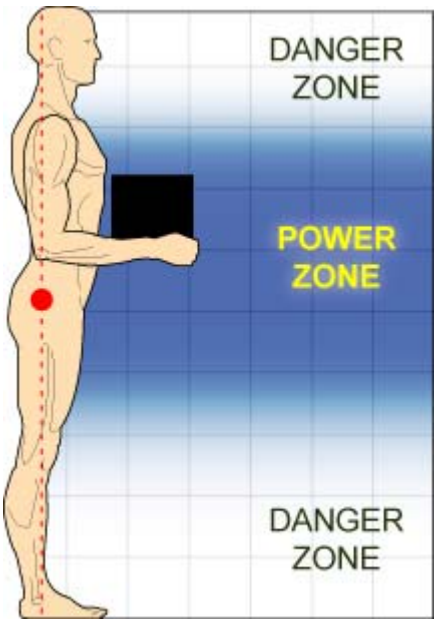


Figure 1: Lifting Power Zone

1.3 Safe Lifting Guidelines

The following safe lifting guidelines will be followed by employees involved in manual lifting activities:

- Before manual lifting is performed, a hazard assessment must be completed. The assessment must consider size, bulk, and weight of the object(s), if mechanical lifting equipment is required, if two-man lift is required, whether vision is obscured while carrying and the walking surface and path where the object is to be carried.
- Get a co-worker to help if equipment or other item is too heavy to lift.
- If possible, use powered equipment instead of manually lifting heavy materials. Lifting equipment such as dollies, hand trucks, lift-assist devices, jacks, or carts can be provided for employees.
- Reduce lifts from shoulder height and from floor height by repositioning the shelf or bin to closer to the power zone.
- Make sure walkways are clear of tripping hazards before moving materials.
- Use your legs and keep your back in a natural position while lifting. Keep the load close to your torso.

- Test the load to be lifted to estimate its weight, size, and bulk and to determine the proper lifting method.
- Do not twist while carrying a load. Instead, shift your feet and take small steps in the direction you want to turn.
- Make sure there are appropriately marked and sufficiently safe clearances for aisles and at loading docks or passageways where mechanical-handling equipment is used.
- Properly stack loose or unboxed materials which might fall from a pile by blocking, interlocking, or limiting the height of the pile to prevent falling hazards.
- Bags, containers, bundles, etc. should be stored in tiers that are stacked, blocked, interlocked, and limited in height so that they are stable and secure to prevent sliding or collapse.

- Storage areas should be kept free from accumulation of materials that could lead to tripping, fire, or explosion.
- Work methods and stations should be designed to minimize the distance between the person and the object being handled.

Supervisors should periodically evaluate work areas and employees' work techniques to assess the potential for and prevention of injuries. New operations should be evaluated to engineer out hazards before work processes are implemented.

1.4 Regulations

OSHA does not have a standard which sets limits on how much a person may lift or carry. They do however state that lifting loads heavier than about 50 pounds will increase the risk of injury.

The National Institute for Occupational Safety and Health (NIOSH) has developed a mathematical model that helps predict the risk of injury based on the weight being lifted and other criteria. The NIOSH model is based on previous medical research into the compressive forces needed to cause damage to bones and ligaments of the back. The mathematical model is incorporated in the *Applications Manual for the Revised NIOSH Lifting Equation*, which can be found on the NIOSH website (http://www.cdc.gov/niosh/docs/94-110/). It should be noted, however, that this NIOSH document provides only voluntary guidelines.

If there is a situation that arises where an employee is required to perform manual lifting on a reoccurring basis, the NIOSH Lifting Equation will be used to determine the appropriate weight that employee can safely lift. The lifting equation establishes a maximum load of 50 pounds for employees that are less likely to have to lift something, and don’t have to do any long distance travel or maneuvering of the item. This 50 pounds is then adjusted to account for:

- how often the employee is lifting
- twisting the back during lifting
- the vertical distance the load is lifted
- the distance of the load from the body
- the distance the employee must move while lifting the load
- how easy it is to hold onto the load

GEI uses 50 pounds as a standard. However each individual should not attempt to carry loads heavier than they can safely manage.

1.5 Training

Training will include general principles of ergonomics, correct manual lifting techniques to avoid musculoskeletal injuries, recognition of hazards and injuries, procedures for reporting hazardous conditions, and methods and procedures for early reporting of injuries.

1.6 Lifting Assistance

If employees are assigned a task that involves repetitive lifting and carrying of equipment the Safety Team and Project Manager should be contacted to conduct an ergonomic evaluation. The task should be discussed to determine if there is an alternative method that can be used. The alternative method should institute an engineering or administrative control to reduce/limit the amount of lifting that is required of the employee. Some examples include providing smaller containers to reduce the weight of what needs to be lifted; providing a device that helps carry awkwardly-shaped objects easier; or using a winch, fork lift, or other device to lift the item(s) for the employee.

1.7 Injury Reporting

Injuries experienced during manual lifting activities should receive prompt medical attention. If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future musculoskeletal injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures for manual lifting.

1.9 References

OSHA Technical Manual (OTM), Section VII: Chapter 1 - Back Disorders and Injuries
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=29936 (Viewed 7/12/2016)
https://www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html (Viewed 7/12/2016)

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- July 2016
- August 2014

STANDARD OPERATING PROCEDURES
SOP NO. HS-026 Hazard Identification and Management

1.1 Objective
This Standard Operating Procedure (SOP) is intended to outline the steps GEI employees will take to identify potential hazards on site, the risks associated with these hazards, and the proper engineering controls, work practices, and personal protective equipment (PPE) to use to minimize the associated risks.

1.2 Hazard Identification
Establishing proper work procedures by conducting a job hazard analysis will should be performed for all projects involving field work. An initial identification of hazards will be completed based on past and current property usage of the site, what tasks are required to perform the job, what equipment is needed to complete the assigned tasks, what hazards are in the working area etc.

The site-specific health and safety plan (HASP) will include a hazard assessment for the project that identifies the potential hazards and how to alleviate the hazard. These hazards will be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Risk Assessment
A risk assessment will be performed for all aspects of field work. This analysis is to determine the quantitative or qualitative value of risk related to a tangible situation and a recognized hazard. Identification, studies, and monitoring of any hazard to determine its potential, origin, characteristics, and behavior are examples of what could be included and performed during a risk assessment. The assessment will increase awareness of workplace hazards and provide an opportunity to identify and control workplace hazards.

1.3.1 Assessment Guidelines
It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational operation or process, and to match the protective devices to the particular hazard.

Assessments should be conducted:

- Prior to starting any work at the site
- As conditions change
- Workplace layout changes
- Environmental changes
- Process changes

- Yearly or other pre-determined interval

1.3.2 Hazard Sources

Some examples of hazard sources include but are not limited to:

- Items, materials, or machinery in motion
- Extreme temperatures
- Chemical exposures
- Harmful dust
- Light radiation
- Falling objects or potential from dropping objects
- Sharp objects
- Rolling or pinching objects
- Layout of workplace and location of co-workers
- Electrical hazards
- Noise exposures
- Confined spaces
- Working near or on water
- Fall hazards
- Traffic or other activities taking place on the site
- Air quality issues

1.4 Prevention – Control Methods

Control methods should be considered in the following hierarchy:

- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment

1.4.1 Elimination and Substitution

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process. If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and

simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard. Employees should work with the Safety Team to find solutions.

1.4.2 Engineering Controls

Engineering controls are used to remove a hazard or place a barrier between the work and the hazard. It's implemented to control the hazard at the source. Examples may include machine guards, sound deading/dampening panels, traffic barriers, guardrails, and shields.

1.4.3 Administrative Controls

Administrative controls change the work procedures such as programs, schedules, and supervision to reduce employee exposure to hazards. The controls are frequently used with existing processes where hazards are not particularly well controlled. Examples of administrative controls are requiring frequent breaks or implementing a specific method to perform a task.

1.4.4 Personal Protective Equipment Selection

To select the proper PPE, the potential hazards must be known. The protective equipment selected must ensure a level of protection *greater than* the minimum required in order to help protect employees. The user must be supplied with a properly fitting protective device and given instructions on care and use. Users must be aware of all warning labels for and limitation of the PPE. Employees must be aware that the PPE does not eliminate the hazard.

1.4.5 Hazard Re-Assessment

As necessary, the workplace should be re-assessed for hazards by identifying and evaluating new equipment and processes, reviewing accident records, and re-evaluating the suitability of previously selected PPE. Re-assessment should occur at a defined regular schedule interval.

1.5 Job Safety Analysis

A job safety analysis (JSA) sometimes referred to as a job hazard analysis (JHA) or an activity hazard analysis (AHA) is the breaking down of any method or procedure into its component parts to determine the hazards connected with each key step and the requirements for performing it safely.

When a JSA is being created, make sure it isn't too general where the resulting information is not enough to assess the hazard and select proper controls, and be careful not to add unnecessary steps.

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHS) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Limitations may arise on a project specific basis and will be addressed as they arise.

1.8 Attachments

None.

1.9 References

Risk Analytics, LLC Hazard Assessment Training Program, January 2011

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- November 2016
- June 2015

STANDARD OPERATING PROCEDURES

SOP No. HS-029 Overtime and Fatigue Management

1.1 Objective

A consistent standard was developed for GEI Consultants, Inc. relative to overtime / fatigue management with the aim of reducing risk associated with worker fatigue, allow for sufficient sleep, and increase mental fitness in an effort to control employee turnover and absenteeism. The following guidelines will be followed when working extended hours or work shifts on GEI projects.

1.2 General

Extended or unusual work shifts may be more stressful physically, mentally, and emotionally. Non-traditional shifts and extended work hours may disrupt the body's regular schedule, leading to increased fatigue, stress, and lack of concentration. These effects lead to an increased risk of operator error, injuries and/or accidents.

Society is oriented toward traditional daytime work hours and work at night will often intensify fatigue and reduce alertness. Workers generally will not acclimate to night work, and sleep patterns will generally be disrupted so the non-work periods do not provide full recovery, resulting in sleep deprivation. Studies suggest that it can take up to 10 days to adapt to a night time work schedule.

Fatigue is a message to the body to rest. It is not a problem if the person can and does rest. However, if rest is not possible, fatigue can increase until it becomes distressing and eventually debilitating. The symptoms of fatigue, both mental and physical, vary and depend on the person and his or her degree of overexertion. Some examples include:

- weariness
- sleepiness
- irritability
- reduced alertness, lack of concentration and memory
- lack of motivation
- increased susceptibility to illness
- depression
- headache
- giddiness
- loss of appetite and digestive problems

Employees and Subcontractors will adhere to the following principles to address worker Overtime / Fatigue Policy:

- Maximum Number of Days in a 21-Day Window = Nineteen (19) days
- Number of Days off = Two (2) days
- Maximum Number of Hours in a Shift = Sixteen (16) Hours / Eighteen (18) hours with approval from
- GEI
- High Overtime Percentage = Overtime totaling more than 75% over a 40 hour work week
- High Overtime Period = last rolling 3 months

1.3 Training

Initial and annual training must be provided on how to recognize fatigue, how to control fatigue through appropriate work and personal habits, and reporting of fatigue to supervision. During training instructors will emphasize that proper sleep and nutrition can also help reduce worker fatigue.

1.4 Ergonomic Controls

Ergonomic equipment will be used to improve workstation conditions such as anti-fatigue mats for standing, lift assist devices for repetitive lifting, proper lighting and control of temperature, and other ergonomic devices as deemed appropriate (see GEI Safe Lifting SOP). Work tasks to control fatigue will be analyzed and evaluated periodically by GEI's health and safety staff. Assessments can be requested per GEI's Ergonomic Program. In addition, to reduce fatigue, chairs should be used by employees to sit periodically and take provide periodic rest breaks.

1.5 Safety Critical Positions

Employees identified as working in safety critical positions, such as working with hazardous materials or operating equipment, must report fatigue/tiredness and lack of mental acuity to their supervisors or Project Manager. In addition the Corporate Health and Safety Officer will be notified to make safety critical decisions and take appropriate actions to prevent loss.

1.6 Prescription and OTC Drug Use

Employees must not chronically use over-the-counter or prescription drugs to increase mental alertness. Employees should refrain from taking any substance known to increase fatigue in that employee, including fatigue that sets in after the effects of the drug wear off.

1.7 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.8 References

1.9 https://www.osha.gov/SLTC/emergencypreparedness/guides/extended.html

1.10 Attachments

None

1.11 Contact

Corporate Health & Safety Officer
East Regional Health & Safety Officer
South Regional Health & Safety Officer
Central Regional Health & Safety Officer
West Regional Region Health & Safety Officer

Appendix F

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 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

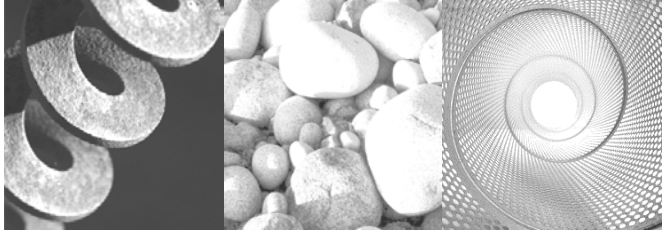
2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/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

APPENDIX F

QUALITY ASSURANCE PROJECT PLAN



GEI Consultants

Consulting
Engineers and
Scientists

Quality Assurance Project Plan

207th Street/9th Avenue
NYSDEC BCP Site No. C231102
375 West 207th Street
New York, NY 10034

Submitted by:
GEI Consultants, Inc., P. C.
1000 New York Avenue, Suite B
Huntington Station, NY 11746
631.760.9300

September 2024
Project 1801342

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Tables

Appendices

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\\bos1v-FS02\Data_Storage\Working\MADDD EQUITIES LLC\1801342 3875 9th Avenue NYC - RI, RIWP, RAWP\SMP\1_FILES TO NYSDEC\2024-09-16 sub\App F- QAPP needs PDF\Rev 207th QAPP 2024-09-16.docx

1. Introduction

This Quality Assurance Project Plan (QAPP) has been prepared to describe the measures that will be taken to ensure that the data generated during performance of site management and post-remedial sampling work at 375 West 207th Street, New York, New York (Site) are of quality sufficient to meet project-specific data quality objectives (DQOs).

The QAPP was prepared in accordance with the guidance provided in New York State Department of Environmental Conservation (NYSDEC) Technical Guidance DER-10 (Technical Guidance for Site Investigation and Remediation), and the United States Environmental Protection Agency's (USEPA's) Guidance for the DQO Process (EPA QA/4). A summary of the field and laboratory sampling is provided in Table 1.

2. Background, Objectives, and Scope

In order to achieve project objectives, GEI Consultants, Inc., P. C. (GEI) has developed a scope of work that includes the collection of post-remedial sub-slab soil vapor and indoor air samples, as outlined in the Site Management Plan (SMP) to which this QAPP is appended. A brief overview of the SMP scope of work is provided below and sample locations are shown on Figure 12 of the SMP.

2.1 Post-Remedial Soil Vapor Intrusion Evaluation Sample Collection

A total of 11 sub-slab soil vapor samples, six indoor air samples, and one outdoor ambient air sample will be collected and analyzed from the sub-slab soil vapor monitoring points and representative indoor and outdoor locations for VOCs via USEPA Air Method TO-15. The soil vapor intrusion evaluation sample collection field and quality control sampling frequency are summarized in Table 2.

3. Project Organization

The overall management structure and a general summary of the responsibilities of project team members are presented below.

Project Principal

Gary Rozmus, of GEI, will serve as Project Principal. The Project Principal is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the investigation.

Project Manager

Wendy Monterosso, of GEI, will serve as Project Manager. This individual will provide overall management for the implementation of the scope of work and will coordinate all field activities. The Project Manager is also responsible for data review/interpretation and report preparation. Activities of the Project Manager are supported by the Quality Assurance Officer.

Quality Assurance Officer (QAO)

Jamie Wargo, of GEI, will serve as QAO. The QAO will review sampling procedures and certify that the data was collected and analyzed using the appropriate procedures. This individual will provide coordination with the analytical laboratory and the data validator to resolve any problems. The proposed data validator is Judy V. Harry of Data Validation Services.

Field Team Leader

The Field Team Leader will be determined prior to the start of work. The Field Team Leader bears the responsibility for the successful execution of the field program, as scoped in the Field Activities Plan (FAP) and the SMP. The Field Team Leader will direct the activities of all technical staff in the field as well all subcontractors. The Field Team Leader will also assist in the interpretation of data and in report preparation. The Field Team Leader reports to the Project Manager.

Laboratory Project Manager

The Laboratory Project Manager is Kevin Hoogerhyde. The Laboratory Project Manager will be responsible for sample container preparation, sample custody in the laboratory, and completion of the required analysis through oversight of the laboratory staff. The Laboratory Project Manager will ensure that quality assurance procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Project Manager reports to the Field Team Leader.

4. Sampling Procedures

Sampling for the Site will include post-remedial groundwater sampling and soil vapor intrusion evaluation sampling to assess the performance of the remedial excavations performed at SB-111/MW-111 and SV-103. Sample locations are shown on Figure 12 of the SMP.

4.1 Sample Type, Location, and Frequency

4.1.1 Soil Vapor Intrusion Evaluation Samples

A total of 11 permanent sub-slab soil vapor sampling points were installed in accordance with the NYSDOH Guidance for Soil Vapor Intrusion Evaluations in New York State (October 2006) in the commercial spaces and the lobby area of the building footprint. In addition, up to six indoor air samples and one outdoor ambient air sample will be collected in conjunction with the sub-slab vapor samples.

Sub-slab vapor, indoor air, and ambient air samples will be analyzed for VOCs via TO-15 analysis.

4.1.3 Field QC Sample Collection

Field QC samples are used to monitor the reproducibility and representativeness of field sampling activities. The field QC samples are handled, transported and analyzed in the same manner as the associated field samples. For sub-slab soil vapor sampling, field QC will include a replicate sample. The quantity, field QC sample type and analysis is detailed in Table 1.

Field Duplicate Samples, also referred to as blind duplicate samples, are two samples that are submitted from the same interval using the same sample procedures. Field duplicates will be used to assess the sampling and analytical reproducibility. Both samples are collected utilizing the same methods and are submitted for the same laboratory analysis however different sample identification numbers are used. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters.

4.2 Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest USEPA's Specifications and Guidance for Contaminant-Free Sample Containers. Certificates of analysis are provided with each bottle lot and maintained on file. to document conformance to USEPA specifications. The containers will be pre-preserved, where appropriate. Sample preservation and containerization details are outlined in Table 3.

4.3 Equipment Decontamination

Disposable dedicated sample tubing will be used to conduct the soil vapor sampling. No decontamination is anticipated or required. Summa canisters are decontaminated and batch certified at the laboratory prior to being delivered for sampling.

5. Quality Assurance/Quality Control

The primary intended use for the endpoint sample data is to document the groundwater concentrations and sub-slab soil vapor levels achieved by the remedy. The primary DQO of the sampling program, therefore, is that data be accurate and precise, and hence representative of the actual Site conditions. Accuracy refers to the ability of the laboratory to obtain a true value (i.e., compared to a standard) and is assessed through the use of laboratory quality control (QC) samples, including laboratory control samples and matrix spike samples, as well as through the use of surrogates, which are compounds not typically found in the environment that are injected into the samples prior to analysis. Precision refers to the ability to replicate a value and is assessed through both field and laboratory duplicate samples.

Sensitivity is also a critical issue in generating representative data. Laboratory equipment must be of sufficient sensitivity to detect target compounds and analytes at levels below NYSDEC standards and guidelines whenever possible. Equipment sensitivity can be decreased by field or laboratory contamination of samples, and by sample matrix effects. Assessment of instrument sensitivity is performed through the analysis of reagent blanks, near-detection-limit standards, and response factors. Potential field and/or laboratory contamination is assessed through use of trip blanks, method blanks, and equipment rinse blanks (also called “field blanks”).

Table 1 lists the field and laboratory QC samples that will be analyzed to assess data accuracy and precision, as well as to determine if equipment sensitivity has been compromised. Appendix I of the SMP shows the reporting limits and minimum detection limits achievable by the laboratory.

All sample analyses (i.e., VOCs via TO-15) will be performed in accordance with the NYSDEC Analytical Services Protocol (ASP), using USEPA SW-846 methods. A laboratory will be selected to analyze the field samples collected during endpoint sample collection and will maintain a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certification for each of the analyses listed in Section 2.0.

All laboratory data are to be reported in NYSDEC ASP Category B deliverables and will be delivered to NYSDEC in electronic data deliverable (EDD) format as described on NYSDEC’s website (http://www.dec.ny.gov/chemical/62440.html). A Quality Assurance Glossary is presented in Appendix B.

Tables

Table 1. Field and Laboratory QC Summary
Quality Assurance Project Plan
375 West 207th Street
New York, New York
Site No. C231102

AC Check Type	Minimum Frequency	Use
Field QC		
Duplicate	1 per matrix per 20 samples or SDG*	Precision
Laboratory QC		
Laboratory Control Sample	1 per matrix per SDG	Accuracy
Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate*	1 per matrix per SDG	Accuracy/Precision
Surrogate Spike	All organics samples	Accuracy
Laboratory Duplicate	1 per matrix per SDG	Precision
Method Blank	1 per matrix per SDG	Sensitivity

Notes:
* SDG - Sample Delivery Group - Assumes a single extraction or preparation
** Provided to lab by field sampling personnel

Table 2. Quality Control Sampling Summary
Quality Assurance Project Plan
375 West 207th Street
New York, New York
Site No. C231102

Sample Medium	Target Analytes	Field Samples	Duplicates (1)	Trip Blanks (2)	Field Blanks	Matrix Spikes	Spike Duplicates	Total No. of Samples
Sub-slab Soil Vapor	TO-15	11	1	NA	NA	NA	NA	12
Indoor Air	TO-15	6	NA	NA	NA	NA	NA	6
Ambient Air	TO-15	1	NA	NA	NA	NA	NA	1

Notes:
(1) - Based on 1 per 20 samples or 1 per Sample Delivery Group
(2) - Based on 1 cooler per day
VOCs - Volatile Organic Compounds
NA - Not Applicable

Table 3. Preservation, Holding Times, and Sample Containers
Quality Assurance Project Plan
375 West 207th Street
New York, New York
Site No. C231102

Analysis	Method	Matrix	Bottle Type	Preservation	Holding Time (a)
TO-15	EPA AIR TO-15	Air	6 liter Summa canister	None	14 days from sample collection

Notes:
(a) Days from date of sample collection.
VOCs - Volatile Organic Compounds

Appendix A

Quality Assurance Glossary

Quality Assurance Glossary

"Alteration" means altering a sample collected for analysis in any way other than by adding a preservative, such as nitric acid to lower pH. Examples of alteration include, but are not limited to: filtering, settling and decanting, centrifuging and decanting, and acid extracting.

"Analytical Services Protocol" or "ASP" means the NYSDEC's compendium of approved EPA and NYSDEC laboratory methods for sample preparation and analysis and data handling procedures.

"Correlation Sample" means a sample taken, when using a field-testing technology, to be analyzed by an ELAP-certified laboratory to determine the correlation between the laboratory and field analytical results.

"Confirmatory Sample" means a sample taken after remedial action is expected to be complete to verify that the cleanup requirements have been met. This term has the same meaning as "post remediation sample."

"Contract laboratory program" or "CLP" means a program of chemical analytical services developed by the United States Environmental Protection Agency (EPA) to support CERCLA.

"Data Usability Summary Report, (DUSR)" is a document that provides a thorough evaluation of the analytical data to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and use.

"Environmental Laboratory Accreditation Program" or "ELAP" means a program conducted by the New York State Department of Health (NYSDOH), which certifies environmental laboratories through onsite inspections and evaluation of principles of credentials and proficiency testing.

"**Final delineation sample**" means a sample taken as an endpoint sample, used to make a decision regarding the extent of contamination at a site, which is to be analyzed by an ELAP-certified laboratory.

"Intermediate Sample" means a sample taken during the investigation process that will be followed by another sampling event to confirm that remediation was successful or to confirm that the extent of contamination has been defined to below a level of concern.

"Method detection limit" or "MDL" means the minimum concentration of a substance that can be measured and reported with a 99 percent confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix containing the analyte.

"Minimum reporting limit" means the lowest concentration at which an analyte can be detected and which can be reported with a reasonable degree of accuracy. It is the lowest concentration that can be measured, a lab-specific number, developed from minimum detection limits, and is also referred to as the practical quantitation limit (PQL).

"Non-targeted compound" means a compound detected in a sample using a specific analytical method that is not a targeted compound, a surrogate compound, a system monitoring compound or an internal standard compound.

"Practical quantitation level" or "PQL" means the lowest quantitation level of a given analyte that can be reliably achieved among laboratories within the specified limits of precision and accuracy of a given analytical method during routine laboratory operating conditions.

"Preservation" means preventing the degradation of a sample due to precipitation, biological action, or other physical/chemical processes between the time of sample collection and analysis. The most common examples involve refrigeration at 4 degrees Celsius and lowering sample pH by the addition of acid to keep dissolved metals in solution or to reduce the biodegradation of dissolved organic analytes.

"Quality assurance" or "QA" means the total integrated program for assuring the reliability of monitoring and measurement data, which includes a system for integrating the quality planning, quality assessment and quality improvement efforts to meet data end-use requirements.

"Quality assurance project plan" or "QAPP" means a document, which presents in specific terms the policies, organization, objectives, functional activities, and specific quality assurance/quality control activities designed to achieve the data quality goals or objectives of a specific project or operation.

"Quality control" or "QC" means the routine application of procedures for attaining prescribed standards of performance in the monitoring and measurement process.

"Targeted compound" means a hazardous substance, hazardous waste, or pollutant for which a specific analytical method is designed to detect that potential contaminant both qualitatively and quantitatively.

"Tentatively identified compound or TIC" means a chemical compound that is not on the target compound list but is detected in a sample analyzed by a GC/MS analytical method. TICs are only possible with methods using mass spectrometry as the detection technique. The compound is tentatively identified using a mass spectral instrumental electronic library search and the concentration of the compound estimated.

"Unknown compound" means a non-targeted compound which cannot be tentatively identified. Based on the analytical method used, the estimated concentration of the unknown compound may or may not be determined.

"Volatile organic compounds" or "VOC" means organic compounds amenable to analysis by the purge and trap technique. For the purposes of this chapter, analysis of volatile organics means the analysis of a sample for either those priority pollutants listed as amenable for analysis using EPA method 624 or those target compounds identified as volatiles in the version of the EPA "Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration" in effect as of the date on which the laboratory is performing the analysis.

APPENDIX G

SITE MANAGEMENT FORMS

SITE INSPECTION LOG
207th STREET / 9th AVENUE
C231102
375 WEST 207th STREET
NEW YORK, NEW YORK

Date: _____ **Time:** _____

Inspector: _____ **Weather:** _____

Purpose of Site Visit: Routine Site Inspection -OR- Incident Report

General Observations (note condition, and damage (if any) including, severity, and impacts, etc.)

Overall Site:

_____

Building Foundation / Slab:

_____

Soil Cover / Landscaping:

_____

Concrete Sidewalks:

_____

Permeable Paver Walkways:

_____

Signs of Erosion:

_____

Evidence of Excavation:

_____

Persons Contacted & Time:

_____

SITE INSPECTION LOG
207th STREET / 9th AVENUE
C231102
375 WEST 207th STREET
NEW YORK, NEW YORK

Monitoring Point Locations:

Sub-slab Vapor Monitoring Points	Location Ok?	Problems/Issues
SS-01		
SS-02		
SS-03		
SS-04		
SS-05		
SS-06		
SS-07		
SS-08		
SS-09		
SS-10		
SS-11		

Recommendations:

_____

_____

_____

Representative Site Photos and Description:

Summary of Green Remediation Metrics for Site Management

Site Name: 207th Street / 9th Avenue Site Code: C231102
Address: 375 West 207th Street City: Inwood
State: NY Zip Code: 10034 County: New York

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CONTRACTOR CERTIFICATION
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of _____ (**Contractor Name**), which is responsible for the work documented on this form. According to my knowledge and belief, all of the information provided in this form is accurate and the site management program complies with the DER-10, DER-31, and CP-49 policies. _____ **Date** **Contractor**

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

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

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? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

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:

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

APPENDIX H

FIELD ACTIVITIES PLAN

September 2024

FIELD ACTIVITIES PLAN

207th Street/9th Avenue
NYSDEC BCP Site No. C231102
375 West 207th Street
New York, New York 10034

Prepared for

J.207 ST. LLC and MFC REALTY CORP.
15 Verbena Avenue, 2nd Floor
Floral Park, New York 11001

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 INTRODUCTION

GEI Consultants, Inc., P.C. (GEI) has developed this Field Activities Plan (FAP) to describe in detail the field sampling methods to be used during performance of the Post-Remedial Sampling and Site Management activities at 375 West 207th Street, New York, New York (Site).

The FAP was prepared in accordance with directives provided in the DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) issued by the New York State Department of Environmental Conservation (NYSDEC), as well as 6 NYCRR Part 375 and provides guidelines and procedures to be followed by field personnel during performance of the Post-Remedial Sampling and Site Management activities. Information contained in this FAP relates to sampling objectives, sampling locations, sampling frequencies, sample designations, sampling equipment, sample handling, sample analysis, and decontamination.

2.0 SAMPLING OBJECTIVES

The Site has undergone prior Site characterization work and a Remedial Action including site-wide excavation of the upper 2 feet of soil/fill, and two hot-spot excavations were conducted at the Site in 2019 and 2023, respectively, by GEI.

The objective of the proposed sampling is to evaluate the effectiveness of the remedy. A soil vapor intrusion (SVI) evaluation will be performed to assess if residual soil vapor is accumulating beneath the new building foundation slab.

The sampling procedures associated with characterization of soil vapors are discussed in detail in Section 4 of this FAP. A discussion of the data quality objectives (DQOs) is provided in the Quality Assurance Project Plan (QAPP) located in Appendix F of the Site Management Plan (SMP). The DQOs will be completed in compliance with DER-10 3.2.2(d).

3.0 SAMPLE MEDIA, LOCATIONS, ANALYTICAL SUITES, AND FREQUENCY

The media to be sampled during the Post-Remedial Sampling and Site Management activities include soil vapor and indoor air. A discussion of the sampling schedule is provided below, while the assumed number of field samples to be collected, including quality control (QC) samples, is shown in Table 1 of this FAP. Specifics regarding the collection of samples at each location and for each task are provided in Section 4 of this FAP.

3.1 Soil Vapor Sampling

As shown in Fig. 12 of the SMP, 11 sub-slab soil vapor samples will be collected at sub-slab soil vapor sample locations SV-101 through SV-111. Samples will be collected per the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH Guidance) and in compliance with NYSDEC DER-10 3.6(b). All samples will be analyzed for VOCs using USEPA method TO-15.

4.0 FIELD SAMPLING PROCEDURES

This section provides a detailed discussion of the field procedures to be used during soil vapor and indoor air sampling being evaluated as part of the Post-Remedial Sampling and Site Management activities. The locations are shown on Fig. 12 of the SMP and additional information including intervals to be sampled and sample rationale is provided in Table 2 of this FAP.

4.1 Soil Vapor Sampling

Soil vapor sampling will be completed in compliance with DER-10 3.6(b). Soil vapor sampling point locations are shown in Table 2c of this FAP and Fig. 12 of the SMP. Eleven sub-slab soil vapor samples (SV-101 through SV-111) will be collected from permanent sub-slab soil vapor points installed beneath the new building foundation slab and vapor barrier. New Teflon®-lined tubing will be used to sample each sub-slab soil vapor sample point.

Prior to sample collection, the Teflon®-lined tubing will be purged of approximately two volumes of the tubing using a vacuum pump set at a rate of 0.2 liters per minute. As described in Section 2.7.5 of the NYSDOH Guidance, a tracer gas (i.e., helium) will be used to enrich the atmosphere in the immediate vicinity of each sampling location using a shroud in order to test the borehole seal and verify that ambient air is not being drawn into the sample. A portable helium detector (MGD-2000, or equivalent) will be used in the field to determine the concentration of helium introduced to the shroud. A sample of the soil gas purged from the temporary vapor point will be measured to ensure that the helium concentration is less than 10% of the concentration within the shroud. Following purging and verification with the tracer gas, the tubing will be connected to the laboratory supplied 6-liter Summa canister. All soil vapor samples will be collected using pre- cleaned 6-liter Summa canisters with regulators calibrated to collect samples over an 8-hour period and analyzed for VOCs using USEPA Method TO-15.

In accordance with the NYSDOH Guidance, a corresponding indoor air sample will be collected from within each of the two commercial spaces and the residential lobby area. An outdoor ambient air sample will also be collected in conjunction with both the sub-slab vapor and indoor air samples.

5.0 SAMPLE HANDLING AND ANALYSIS

To ensure quality data acquisition and collection of representative samples, there are selective procedures to minimize sample degradation or contamination. These include procedures for preservation of the samples as well as sample packaging and shipping procedures.

5.1 Field Sample Handling

The types of containers, volumes needed, and preservation techniques for the aforementioned testing parameters are presented in Table 3.

5.2 Sample Custody Documentation

The purpose of documenting sample custody is to confirm that the integrity and handling of the samples is not subject to question. Sample custody will be maintained from the point of sampling through the analysis. Specific procedures regarding sample tracking from the field to the laboratory are described in GEI's SOP for Sample Management (Attachment 1).

Each individual collecting samples is personally responsible for the care and custody of the samples. All sample labels will be pre-printed or filled out using waterproof ink. The technical staff will review all field activities with the Field Team Leader to determine whether proper custody procedures were followed during the fieldwork and to decide if additional samples are required.

All samples being shipped off-site for analysis must be accompanied by a properly completed chain of custody form (Attachment 2 or similar). The sample numbers will be listed on the chain of custody form. When transferring the possession of samples, individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to/from a secure storage area, and to the laboratory.

Samples will be packaged for laboratory pick up and/or shipment with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be locked and/or secured with strapping tape in at least two locations for shipment to the laboratory.

5.3 Sample Shipment

Laboratory courier services are the preferred method for sample transport on this project. However, in the event that samples are shipped to the laboratory the following procedures will apply. Sample packaging and shipping procedures are based upon USEPA specifications, as well as U.S. Department of Transportation (DOT) regulations. The procedures vary according to potential

sample analytes, concentration, and matrix, and are designed to provide optimum protection for the samples and the public. Sample packaging and shipment must be performed using the general outline described below. Additional information regarding sample handling is provided in GEI's SOP for Sample Management (Attachment 1).

All samples will be shipped the same day of collection (when possible) and will be preserved appropriately from the time of sample collection. A description of the sample packing and shipping procedures is presented below:

1. Prepare cooler(s) for shipment.
   - Tape drain(s) of cooler shut.
   - Affix "this side up" arrow labels and "fragile" labels on each cooler.
   - Place mailing label with laboratory address on top of cooler(s).
2. Arrange sample containers in groups by sample number or analyte.
3. Ensure that all bottle labels are completed correctly. Place clear tape over bottle labels to prevent moisture accumulation from causing the label to peel off.
4. Arrange containers in front of assigned coolers.
5. Place packaging material at the bottom of the cooler to act as a cushion for the sample containers.
6. Arrange containers in the cooler so that they are not in contact with the cooler or other samples.
7. Fill remaining spaces with packaging material.
8. Ensure all containers are firmly packed with packaging material.
9. If ice is required to preserve the samples, ice cubes should be repackaged in double Zip-Loc™ bags, and placed on top of the packaging material.
10. Sign chain of custody form (or obtain signature) and indicate the time and date it was relinquished to Federal Express or other carrier, as appropriate.
11. Separate chain of custody forms. Seal proper copies within a large Zip-Loc™ bag and tape to cooler. Retain copies of all forms.
12. Close lid and latch.
13. Secure each cooler using custody seals.
14. Tape cooler shut on both ends.
15. Relinquish to Federal Express or other courier service as appropriate. Retain airbill receipt for project records. (Note: All samples will be shipped for "NEXT A.M." delivery).
16. Telephone laboratory contact and provide him/her with the following shipment information:
    - Sampler's name.
    - Project name.
    - Number of samples sent according to matrix and concentration.
    - Airbill number.

6.0 SITE CONTROL PROCEDURES

Site control procedures, including decontamination and waste handling and disposal, are discussed below.

6.1 Decontamination

Disposable dedicated sample tubing will be used to conduct the soil vapor sampling. No decontamination is anticipated or required.

6.2 Waste Handling and Disposal

No waste materials (drill cuttings, purge water, decontamination water, etc.) are anticipated to be generated during the Post-Remedial Sampling and Site Management. Disposable waste materials (i.e., nitrile gloves, tubing, etc.) will be properly disposed in the trash.

TABLES

1. Field and Quality Control Sampling Summary
2. Proposed Groundwater, Sub-slab Soil Vapor and Indoor/Ambient Air Sampling Locations
3. Preservation, Holding Times, and Sample Containers

Table 1. Field and Quality Control Sampling Summary

Sample Medium	Target Analytes	Field Samples	Duplicates[1]	Trip Blanks[2]	Field Blanks[1]	Matrix Spikes[1]	Spike Duplicates[1]	Total No. of Samples
Soil Vapor	TO-15 VOCs	11	NA	NA	NA	NA	NA	11

Totals are estimated based on scope of work as written.

[1] Based on 1 per 20 samples or 1 per Sample Delivery Group

[2] Based on 1 cooler per day, assuming 1 day of fieldwork

TCL - USEPA Contract Laboratory Program Target Compound List

VOCs - Volatile Organic Compounds

NA - Not Applicable

Table 2. Proposed Groundwater, Sub-slab Soil Vapor and Indoor/Ambient Air Sampling Locations

Monitoring Point Location	Matrix	Sample Depth	Sample Parameters	Sampling Method*	Rationale
SV-101 – SV-111	Soil Vapor	Sub-slab	VOC	TO-15	Baseline sub-slab soil vapor quality following remediation
Indoor Air	Air	Indoor Air	VOC	TO-15	Indoor Air Quality within the commercial spaces and residential lobby areas.
Ambient Air	Air	Ambient Air	VOC	TO-15	Outdoor Air Quality in the building's vicinity

* Laboratory will report to their minimum possible standards for each method (SMP Appendix I)
VOCs - Volatile Organic Compounds

QA/QC samples will be collected as described in the QAPP (Appendix F)

Table 3. Preservation, Holding Times and Sample Containers

Analysis	Matrix	Bottle Type	Preservation	Holding Time(a)
TO-15	Air	6-liter Summa Canister	None	14 days from sample collection

[(a)] Days from date of sample collection.

Attachment 1
SOPs

STANDARD OPERATING PROCEDURE

AR-006 Air Sampling for Volatile Organic Compounds (VOCs) using Summa Canisters

1. Objective

Describe standard procedures for the collection of ambient air samples to be analyzed for volatile organic compounds (VOCs) using Summa canisters. Typically, U.S. EPA Method TO-15 is used for laboratory analysis. The site-specific Work Plan should be consulted for proposed sample locations and sampling duration.

2. Materials

- Sampling canister
- Flow controller
- Vacuum gauge
- Wrench for removing fittings and assembling the sample train
- Data sheets for recording the sampling location, date, duration, starting and stopping times, and calculated sample volume
- Camera and measuring tape
- Weather station data
- PID

3. Sampling

This section details the sampling methodology and the media preparation by the analytical laboratory.

3.1. Sampling Equipment Overview

- The laboratory prepares the canister for sampling by cleaning and then evacuating the contents to a vacuum of approximately 29.9 inches of Mercury (in. Hg). Opening the stainless steel bellows valve allows the air sample to enter the canister. When the target volume of sample is collected, close the valve and return the canister to the laboratory.
- A flow controller is used as part of the sample train to control the amount of air allowed to flow into the container over time. Flow controllers are typically set to a flow rate that collects a sample continuously over a 1-hour (hr), 8-hr, or 24-hr interval. The sampling duration needs to be communicated to the laboratory prior to sampling, so that the laboratory can provide the appropriate flow controller.
- Summa canisters are typically used and named after the “Summa” process which describes the electro polishing of the interior surface of the canister to prepare it for sampling.
- The holding time for a standard VOCs list of EPA Method TO-15 is 30 days after sample collection, although some projects may require a shorter hold time.

3.2. Document Field Conditions

Document pertinent field conditions prior to sample collection:

- Record weather information, if available (such as precipitation, temperature, barometric pressure, relative humidity, wind speed, and wind direction) at the beginning of the sampling event. Record substantial changes to these conditions that may occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport). Data should be obtained for at least the past 12 hours.
- Sketch the site, area streets, neighboring commercial or industrial facilities (with estimated distance to the site), outdoor air sampling locations (if applicable), and compass orientation (North).
- Record pertinent observations, such as odors and readings from field instrumentation.

3.3. Sample Collection

- Collect samples in a clean Summa canister (or equivalent) using a flow controller calibrated for the anticipated sample duration (e.g. 8-hour, 24-hour, etc.). The flow controller flow rate should not exceed 0.2 liters per minute.
- Verify the initial vacuum of the canister using the vacuum gauge. If the canister vacuum is less than 25 in. Hg, do not use it. The procedure to verify the initial pressure is simple, and a missed step can compromise the validity of the sample media.
    i. Confirm the canister's bellows valve is closed by turning the knob clockwise to tighten.
    ii. Remove the brass cap from the canister inlet.
    iii. Attach the vacuum gauge.
    iv. Open and close the bellows valve quickly (a few seconds).
    v. Read and record the vacuum on the gauge as 'Initial vacuum' on the chain-of-custody (COC).
    vi. Confirm the bellows valve is closed by turning the knob clockwise to tighten.
    vii. Remove the vacuum gauge and replace the brass cap.
- <u>Begin Sampling</u>
    i. Confirm the bellows valve is open by turning the knob counter-clockwise to loosen.
    ii. Remove the brass cap.
    iii. Attach the flow controller.
    iv. Attach a "J"-shaped sampling cane to prevent precipitation from entering the canister.
    v. Place the canister at the sampling location open the bellows valve. If the sample is collected from breathing height (e.g., 3 to 5 feet above ground), then mount the canister on a stable platform such that the sample inlet should be at the proper height.

vi. Record the start date and time on the COC.
vii. Record the identification numbers for the canister and flow controller and the vacuum gage.

- Begin Sampling (with a field duplicate)
  i. Confirm the bellows valve is closed by turning the knob clockwise to loosen on both canisters.
  ii. Remove the brass cap from both canisters.
  iii. Attach a flow controller on both canisters.
  iv. Attached a "T"-shaped sample train designed for field duplicates to both canisters.
  v. Attach a "J"-shaped sampling cane to the common end of the sampling "T" to limit precipitation entering the canisters.
  vi. Place the attached primary and duplicate canisters at the sampling location open the bellows valve. If the sample is collected from breathing height (e.g., 3 to 5 feet above ground), then mount the canister on a stable platform such that the sample inlet should be at the proper height.
  vii. Record the start date and time on the COC.
- Monitoring Sample progress
  i. At regular intervals, record the vacuum on the flow controller to confirm that the vacuum is decreasing in the canister. If the vacuum reads 5 in. Hg or less the bellows valve should be closed and the sample interval ended.
  ii. Some residual vacuum is important to maintaining sample integrity. If there is no vacuum remaining, call the laboratory and discuss the sample viability with them. Evaluate whether another sample will be taken after sharing the laboratory's opinion with your project manager.
- End Sampling
  i. Sampling will end when the time interval (e.g., 8-hr period) is completed, or when the canister vacuum reads 5 in. Hg or less.
  ii. Close the bellow valve by turning the knob clockwise to tighten.
  iii. Remove the "J"-shaped sampling cane.
  iv. Remove the flow controller.
  v. Attach the vacuum gauge.
  vi. Open and close the bellows valve quickly (a few seconds).
  vii. Read and record the vacuum on the gauge as 'Final vacuum' on the chain-of-custody (COC).
  viii. Confirm the bellows valve is closed by turning the knob clockwise to tighten.
  ix. Remove the vacuum gauge and replace the brass cap.
- Sample Transport
  i. Return the canister, flow controller, and sampling cane to the laboratory in the boxes provided.
  ii. Fill out the COC and relinquish samples properly with flow controller and canister numbers on the COC.

iii. Place the COC in the box and retain a copy of the COC for your records.
iv. Tape the box shut.
v. Deliver or ship the samples to the laboratory as soon as practical to adequately meet the holding time of the sample.

4. General Guidance

- This method may be modified for indoor air sampling.
- Field Blank: Do not collect a field blank.
- Trip Blank: Do not collect a trip blank. The canister is prepared for sampling by evacuating the contents to a vacuum of, so no air exists for a trip blank to provide meaningful information.

5. References

Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/ Mass Spectrometry (GC/MS), US Environmental Protection Agency, Office of Research and Development, Center for Environmental Research Information, Cincinnati, OH, EPA/625/R-96/010b, January 1999.

Guide To Air Sampling & Analysis, Air Toxics, Ltd., Folsom, CA.

6. Contacts

Brian Skelly
Mark C. Ensign

STANDARD OPERATING PROCEDURE

FD-003 Sample Management and Chain of Custody

1. Objective

Describe methods to label sample containers, manage the samples, and prepare Chain of Custody documentation for the samples. Sample transport is also addressed.

2. Project Setup

When setting up a sampling event, inform the recipients of the samples (laboratories) and recipients of laboratory results (data group and project managers). Discuss with the laboratory the sampling media, turnaround times, and reporting limits for appropriate regulatory criteria for the site. Include the data group on correspondence so that turnaround times, data validation, and project deliverable schedules can be tracked successfully.

- Laboratory - Number of samples, analyses needed: bottle orders and holding times, turnaround times needed, reporting limits needed for regulatory criteria.
- Data group - Number of samples, analyses requested, turnaround times and reporting limits requested, data validation needed, regulatory criteria to use for tabulating results, deliverables needed, and project name and number.
- Schedule - Inform the laboratory and Data Group of schedule delays, changes to analyses, and expediting.

3. Sampling Execution

- Review the work plan prior to sampling to determine the following:
  - Sample matrix and sampling method.
  - Required analysis and sample volumes.
  - Sample container type and preservative requirements.
  - Required analysis methods and/or report formats.
  - The turnaround time required by the project.
  - If the data will be sent directly from the laboratory to the data validator, Project Manager, or Data Group.
  - Holding time restrictions for sampling media and analytical methods.
  - Sample naming convention used for this project site.
- Sample labels should be filled out using a waterproof or permanent marker or pen. Required information includes:
  - Sample ID.
  - Date and time (military time) of sample collection.
  - Project number.
  - Sample preservatives.
  - Sampler's initials.
  - Laboratory analytical methods.

- Place the label on the jar or bottle, not on the cap. Sample custody begins at this time.
- Record the above information in the field notebook.
- Individually wrap sample jars with packing material, if needed. See SOP SC-002 for guidance on packaging samples for shipment to the laboratory by way of common carrier. Place samples in a cooler with bagged ice or freezer packs (blue ice) immediately after collection. Add sufficient ice or freezer packs to cool samples to approximately 4°C.
- Complete a chain of custody (COC) for the samples as described below. GEI or laboratory COCs may be used as long as they contain fields for all required sample information as described in Section 2.1.

3.1. Chain-of-Custody (COC) Completion

- Fill out COC neatly and in permanent ink. Alternatively, an Excel version of the GEI COC is available and can be filled out electronically.
- Certain analyses (i.e. air analysis by TO-15) require specialized, laboratory issued COCs. Make sure any specialized COCs are available before sample collection.
- Record the project name and number, the sampler's name(s) and the state where the samples were collected.
- For each sample, enter the sample identification number, date and time (military time) collected, the number of sample containers, and any additional information to fulfill project, client or regulatory requirements.
- Record the type of analysis (including laboratory method; e.g. EPA-SW846 Method XX) requested and the preservative (if appropriate) in the vertical boxes.
- Field duplicates should be anonymous to the laboratory, but must be recorded for use by the Data Group. To keep track of this information, link the field duplicate with the proper sample in the field notebook. If required by the Project Manager or Data Group, also document this information on or attach a note to the GEI copy of the COC.
- Trip blanks for large sites should be named similar to the samples they are collected with so that there are not two of the same sample name for the same site. For example, "OU1TB-122509" and "OU3TB-122509" would avoid any mistakes.
- Strike incorrect entries on the COC with a single line, followed by the initials of the person making the correction, the date, and the correct entry.
- When sample custody is ready to be relinquished, complete the bottom of the form with date and time (military time) and signatures of relinquisher and receiver of samples as indicated. The sample collector is always the first signature while the analytical laboratory is the final signature. Theoretically, all individuals handling the samples between collection and laboratory should sign the form; however, if a common carrier (i.e., Federal Express, UPS) is used for shipping, GEI must identify the carrier in the 'Received by' box on the

COC. If the sampler hand delivers the samples to the laboratory, the received box must be signed by the laboratory.

- If the samples are placed in a designated secure area (e.g. GEI sample fridge), note this location in the "Received by" box on the COC.
- GEI uses both single sheet and triplicate COCs. If using the triplicate COCs (white, yellow, and pink copies), the pink copy should be retained by the sampling personnel and provided to the Data Group for proper filing. The white and yellow copies should accompany the samples to the laboratory.
- If you are using the single sheet COC, make a copy of the COC after it has been signed by the lab courier and forward it to the Data Group.
- Prior to sample shipment by common carrier, the COC must be placed inside the cooler in a Ziplock bag or other watertight package.
- If a common carrier such as FedEx is used to transport the samples to the laboratory, include the carrier tracking number and identify the carrier in the "Received by" box on the COC.
- If a courier is used to transport samples to the laboratory (lab courier or GEI personnel), the courier signs the COC in the "Received by" box.
- Place a custody seal on the cooler if shipping via common carrier.
- Transport samples to the laboratory as soon as possible. It is preferable to transport the samples directly to the laboratory from the field. Samples brought back to the office for storage prior to submission to the laboratory must be kept cold (4° C).
- Unused sampling containers/media that are sent back to the lab should be included on a separate COC.
- After the samples are sent to the laboratory, the GEI copy of the COC must be forwarded to the Data Group: datagroup@geiconsultants.com.

4. Limitations

- Keep the number of people involved in handling samples to a minimum.
- Where practical, only allow people associated with the project to handle the samples.
- Always document the transfer of samples from one person to another on the COC.
- The COC should always accompany the samples.
- Give samples positive identification at all times that is legible and written with waterproof or permanent ink.
- When sending samples via a common carrier, use one COC per package.
- Where practical, avoid sending samples from more than one site with separate COCs in a single package.

5. References

New Jersey Department of Environmental Protection, Field Sampling Procedures Manual, August 2005.

Connecticut Department of Environmental Protection, Guidance for Collecting and Preserving Soil and Sediment Samples for Laboratory

6. Attachments

Attachment A - Example Chains of Custody
Attachment B - Shipping Info Pics

7. Contact

Brian Skelly
Leslie Lombardo

Chain of Custody Record

Example COC

STL Connecticut
128 Long Hill Cross Road
Shelton, CT 06484
Tel: 203-929-8140

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client: GEI	Project Manager: Dave Terry	Date: 12-31-07	Chain of Custody Number: 00452
Address: 455 Winding Brook Dr	Telephone Number (Area Code)/Fax Number: 860 368 5300 / 860 368 5307	Lab Number	Page 1 of 1
City: Glastonbury / State: CT / Zip Code: 06033	Site Contact: M. Felter	Lab Contact: Paul Mobart	
Project Name and Location (State): Carroll Gardens NY	Carrier/Waybill Number: FedEx 9383 7603 0879		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: VOC 8260B	SVOC 8270C	TO-15 + NAPHTHALENE	Special Instructions/ Conditions of Receipt
CGSB-01 (0-2)	12-31-07	1130				X	X						X	X		
CGSB-02 (3-4)	12-31-07	1250				X	X						X	X		
CGSB-02 (3-4) MS	12-31-07	1250				X	X						X	X		
CGSB-02 (3-4) MSD	12-31-07	1250				X	X						X	X		
CGSB-XX (5-6)	12-31-07	0800				X	X						X	X		
CGTB-123107	12-31-07	1400				TB				X			X			
CGGW-01	12-31-07	1430		X			X			X			X	X		
CGSG-01	12-31-07	0700-1500	X												X	CANISTER # 2613 REGULATOR # 779

Per NEW JERSEY: "CLP data package deliverables"

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other See Contract

QC Requirements (Specify): NYS Cat B ASP deliverable send to Lorie Mackinnon

Send EDD to datagroup@geiconsultants.com

1. Relinquished By: Melissa J Felter	Date: 12-31-07	Time: 1600	1. Received By: FedEx Waybill 923117-4432	Date: 12-31-07	Time
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: USED FLOW CONTROLLER FOR AIR SAMPLE INCLUDED

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

EXAMPLE COC

Chain-of-Custody Record

Laboratory: Accutest

Laboratory Job # (Lab use only)

GEI Consultants
400 Unicorn Park Dr.
Woburn, MA 01801
PH: 781.721.4000
FX: 781.721.4073

Project Information

Project Name: MWRA - Low Service Storage Tank
Project Location: Stoneham, MA
Project Number: 093400
Project Manager: D. Aghjayan

Page _1_ of _1_

Send Report to: rseigener@geiconsultants.com
Send EDD to: labdata@geiconsultants.com

MCP PRESUMPTIVE CERTAINTY REQUIRED – YES NO

If Yes, Are MCP Analytical Methods Required? YES NO NA
If Yes, Are Drinking Water Samples Submitted? YES NO NA
If Yes, Have You Met Minimum Field QC Requirements? YES NO NA

Lab Sample Number	GEI Sample ID	Collection Date	Collection Time	Matrix	No. of Bottles	Sampler(s) Initials	PCBs	VPH Fractions Only	EPH Fractions Only	SVOCs	VOCs, % Solids**	Conductivity	RCRA 8 Metals*	TPH by GC/FID DRO
							Preservative: None	MeOH	None	None	MeOH	None	None	None
	093400-LS6-S5(19'-21')	12/29/2009	9:30	SO	3	JMR		x			x			
	093400-LS6-COMP (FILL)	12/29/2009	9:30	SO	1	JMR	x		x	x		x	x	x
	093400-LS6-COMP (NATIVE)	12/29/2009	15:00	SO	1	JMR	x		x	x		x	x	x
	093400-LS8-COMP	12/29/2009	14:00	SO	1	JMR	x		x	x		x	x	x
	093400-LS9-S4 (8'-8'-5")	12/30/2009	14:30	SO	3	JMR		x			x			
	093400-LS9-COMP	12/30/2009	15:00	SO	1	JMR	x		x	x		x	x	x

Analysis

Sample Handling

Samples Field Filtered
YES NO NA

Sampled Shipped With Ice
YES NO

Sample Specific Remarks

MCP Level Needed: GEI requires the most stringent Method 1 MCP standard be met for all analytes whenever possible.

Relinquished by sampler: (signature)	Date:	Time:	Received by: (signature)
1. Joseph M. Reyes	12/30/09	16:30	1. GEI FRIDGE
2. GEI FRIDGE	1/4/10	1310	2. Naomi Stegman
3. Naomi Stegman	1/4/10	1310	3. [illegible]
4.			4.

Turnaround Time (Business days):

Normal _X_ Other ____
10-Day ____ 7-Day ____
5-Day ____ 3-Day ____

Before submitting rush turnaround samples, you must notify the laboratory to confirm that the TAT can be achieved.

Additional Requirements/Comments/Remarks:

Please use MA Landfill List

* Please run TCLP analysis for RCRA 8 Metals results that exceed the 20 times rule.

** Please use % solids sample for VOC and VPH analysis of 093400-LS6-COMP (FILL), 093400-LS6-COMP (NATIVE), 093400-LS8-COMP, and 093400-LS9-COMP

Chain-of-Custody Record

Laboratory:

Laboratory Job # (Lab use only)

GEI Consultants

455 Winding Brook Drive, Suite 201
Glastonbury, CT 06033
PH: 860.368.5300
FX: 860.368.5307

Project Information

Project Name/Number:

Project Location:

Project Contact:

Phone Number:

Page __ of __

Send Report to:

Send EDD to: datagroup@geiconsultants.com

Preservative

Analysis

Sample Handling

Samples Field Filtered

YES NO NA

Samples Shipped With Ice

YES NO

Deliverables:

If Yes, Have You Met Minimum Field QC Requirements? YES NO NA

Lab Sample Number	GEI Sample ID	Collection		Matrix	No. of Bottles	Sampler(s) Initials	Sample Specific Remarks
		Date	Time				

Relinquished by sampler: (signature)	Date:	Time:	Received by: (signature)
1.			1.
Relinquished by: (signature)	Date:	Time:	Received by: (signature)
2.			2.
Relinquished by: (signature)	Date:	Time:	Received by: (signature)
3.			3.
Relinquished by: (signature)	Date:	Time:	Received by: (signature)
4.			4.

Turnaround Time (Business days):

Normal _____ Other _____

10-Day _____ 7-Day _____

5-Day _____ 3-Day _____

Before submitting rush turnaround samples, you **must** notify the laboratory to confirm that the TAT can be achieved.

Additional Requirements/Comments/Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PACKING SAMPLES FOR SHIPMENT BACK TO THE LABORATORY

A. Line cooler with bubble wrap and large plastic bag. Use absorbent pad inside the bag if bottles contain preservatives.

B. Wipe outside of bottles and put glass in individual bubble bags & seal. Place bottles & the temperature blank into cooler. Leave room for ice in between bottles & on top.

C. Place double bagged or loose ice randomly around bottles throughout the cooler.

D. Place large bag of ice or loose ice on top of the bottles. In warm weather, the cooler should be packed with as much ice as possible.

E. Close outer bag, compress excess air out of bag, twist top and knot. If necessary, use more bubble wrap to fill the dead air spaces. Place chain of custody (COC) and other paperwork in plastic bag and seal. Place on top of cooler.

F. Close cooler, place signed and dated Custody Seals over opening. Tape over the Custody Seal and seal cooler securely. Fill out overnight shipping waybill and attach to the top or handle of the cooler. Attach Saturday delivery stickers if needed. Ship according to DOT regulations.

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D. Place large bag of ice or loose ice on top of the bottles. In warm weather, the cooler should be packed with as much ice as possible.

E. Close outer bag, compress excess air out of bag, twist top and knot. If necessary, use more bubble wrap to fill the dead air spaces. Place chain of custody (COC) and other paperwork in plastic bag and seal. Place on top of cooler.

F. Close cooler, place signed and dated Custody Seals over opening. Tape over the Custody Seal and seal cooler securely. Fill out overnight shipping waybill and attach to the top or handle of the cooler. Attach Saturday delivery stickers if needed. Ship according to DOT regulations.

STANDARD OPERATING PROCEDURE

FD-004 Photo Documentation

1. Objective

Describe methods to document and retain photographic records.

Keeping a record of photographs taken is crucial to their validity as a representation of existing conditions.

2. Execution

- Photographs of a site, individual samples, or other observations should be taken using a digital camera.
- Set the camera to record the time and date for each photograph.
- All photographic records, along with the following information, should be recorded in the field notebook (SOP FD-001).
    - If applicable, the compass direction describing the direction the photograph was taken (e.g. looking southeast). This may not apply to photographs of individual samples.
    - Brief description of what the photograph is intended to show.
- The field notebook should note who took the photographs.
- The photographs should be electronically backed up on a computer or other data storage device.
- If photographs will be used in a report, memo, or letter, they should be placed on a photograph record template and the relevant information describing the photograph should be inserted into the caption section for each photograph.

3. Limitations

- Some clients and regulatory agencies require photographs of every subsurface soil sample collected. These photographs typically include a “whiteboard” which indicates the site, the boring ID, and the depth of the sample, while logging details are recorded in the field notebook. Under these circumstances, it is not necessary to include compass directions or descriptions.

4. References

New Jersey Department of Environmental Protection, Field Sampling Procedures Manual, August 2005.

5. Attachments

Attachment A – Example of Photo Documentation Template

6. Contact

Melissa Felter
Leslie Lombardo

Attachment A – Example of Photo Documentation Template
GEI Consultants, Inc.

Project: Project Name

Location: Project Location

Photographer: K. Barber
Date: 10/25/07
Photo No.: 1
Direction: N

Comments:
Entrance of site with tree mulching operations.

Photographer: K.Barber
Date: 10/25/07
Photo No.: 2
Direction: W

Comments:
On-site building built in 1936.

STANDARD OPERATING PROCEDURE

QA-002 Field Quality Control Samples

1. Objective

Field Quality Control (QC) samples are used to monitor the reproducibility and representativeness of field sampling. The QC samples are handled, transported, and analyzed in the same manner as the associated field samples. QC samples may include trip blanks, equipment blanks, and field duplicates.

2. Execution

2.1. Trip blanks

- Used to monitor possible sources of contamination from transport, storage, inadequate bottle cleaning, or laboratory methodologies.
- Sample containers filled at the laboratory with analyte-free water are transported to and from the site, and are not opened until time of analysis.
- Trip blanks are stored with the sample containers prior to and after field activities and remain with the collected samples until analyzed.
- Generally, one trip blank per volatiles analysis (e.g. volatile organic compounds) shipment.
- Consider submitting a trip blank when sample shipment is by Fed Ex or other large carrier, or laboratory courier.
- Trip blanks should be recorded in the field notebook and on the chain-of-custody that same as all other samples.

2.2. Equipment blanks

- Equipment blanks (also known as equipment rinsate blanks) are used to monitor possible sources of contamination associated with sample collection. Monitors on-site sampling environment, sampling equipment decontamination, sample container cleaning, the suitability of sample preservatives and analyte-free water, and sample transport and storage conditions
- Equipment blanks are collected by pouring laboratory supplied or distilled or deionized water over sampling tools that have been decontaminated per the work plan, into sample containers.
- Equipment blanks are stored with the associated field samples until submitted for analysis.
- Generally collected when site conditions indicate site related contamination is a concern. Check project-specific work plan and/or quality assurance project plan for required frequency.
- Prepare equipment blanks immediately after the equipment is cleaned in the field and before leaving the sampling site.
- Prepare equipment blanks by rinsing the decontaminated sampling equipment set with the appropriate type of analyte-free water and collecting the rinse water in appropriate sample containers.

- If a potable water rinse is the typical final step, collect the equipment blank with analyte-free water after the potable water rinse.
- Equipment blanks should be recorded in the field notebook and on the chain-of-custody that same as all other samples.

2.3. Field Duplicates

- Used to evaluate the precision and representativeness of the sampling procedures.
- Field duplicates are two samples collected from the same location using the same procedures. Both samples are submitted to the laboratory as individual samples with different sample identification.
- Field duplicates from groundwater sampling for all analyses except volatiles analysis are collected by alternating filling sample containers from the same sampling device. Field duplicates for volatiles analysis are filled sequentially.
- Soil or sediment field duplicates are collected by homogenizing the sample for all analyses except volatiles. The homogenized sample is then divided into two equal portions and placed in separate sample containers. Field duplicates for volatile analysis are collected at two adjacent sampling locations.
- Each sample is assigned different sample identifications.
- Field duplicates are generally collected at frequency of 1/20 samples. Check project-specific work plan and/or quality assurance project plan for required frequency.
- All field QC samples should be labeled in the field and submitted “blind” to the laboratory – as if they are separate, primary samples.
- Field duplicates should be recorded in the field notebook and on the chain-of-custody that same as all other samples.
-

2.4. Matrix-Spike samples (MS/MSD)

- Matrix spike and matrix spike duplicate samples (MS/MSDs) are environmental samples that are spiked in the laboratory or in the field with a known concentration of a target analyte(s) to verify percent recoveries.
- Matrix spike and matrix spike duplicate samples are primarily used to check sample matrix interferences. They can also be used to monitor error due to laboratory bias and poor precision. However, a data set of at least three or more results is necessary to statistically distinguish between laboratory performance and matrix interference.
- Generally, the laboratory is required to extract and analyze MS or MS / MSDs at a minimum frequency of 5% of samples being analyzed for the target analyte(s). If the project or client criteria require an MS or MS/MSD, collect sufficient volume in the appropriate containers, and designate the sample to be used as the MS or MS/MSD on the chain of custody.
- Calculate the percent recovery for all spiked analytes for both the MS and MSD. For MS/MSDs also calculate the relative percent difference (RPD). The

RPD for each spiked analyte is calculated using the amount detected not percent recovery. If your data will be subjected to validation, the % recovery and the RPD will generally be determined by the validator.

2.5. Typical QA/QC Frequency

- QA/QC frequency is determined by project, client or regulatory criteria and should be verified prior to sample collection. Generally, QA/QC samples are collected according to the frequency described below:

Duplicate Samples	One per sampling event, one per 10 samples collected, or one every two weeks, whichever comes first.
Equipment Blanks	For each equipment type that is not dedicated or disposable - one per sampling event, one per 20 samples collected, or one every two weeks, whichever comes first.
Trip Blanks	One per sample delivery group, or in each cooler containing VOC soil or aqueous samples, depending on project.
MS or MS / MSDs	One MS or MS/MSD per sampling event, one per 20 samples collected, or one every two weeks, whichever comes first.

3. Limitations

- Trip blanks must never be opened in the field.
- Trip blanks are usually for VOCs only because less volatile compounds are not likely to cross-contaminate other samples by simply being in close proximity.
- Laboratory-grade water must be used during the collection of equipment blanks.
- Field duplicates must have different sample identifications.

4. References

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (November 1986), U.S. Environmental Protection Agency Department of Solid Waste, Washington, D.C.

U.S. Environmental Protection Agency Office of Emergency and Remedial Response, 1990, Quality assurance/quality control guidance for removal activities: EPA/540/G-90/004, Sampling QA/QC Plan and Data Validation Procedures Interim Final, April, 1990.

5. Contact

Brian Conte
Pat King

STANDARD OPERATING PROCEDURE

SC-002 Environmental Sample Handling

1. Objective

Describe appropriate environmental sample handling procedures.

The procedures include collection and transport of environmental samples to a laboratory for chemical analysis. Appropriate sample handling should ensure that samples are properly:

- labeled and documented;
- preserved;
- packaged; and
- transported

2. Execution

- Prior to mobilizing to the field, select a shipper or arrange for a courier for sample delivery to the laboratory. If using a shipper (i.e., FedEx or UPS) determine the time constraints for pickup requests, the location and hours of the nearest shipping office, and any size/weight restrictions.
- A waterproof or permanent ink pen should be used for all labels. The label should have an adhesive backing and be placed on the jar or bottle, not on the cap. In addition, clear packing tape can be placed over the sample label to secure it to the bottle as moisture from the samples can loosen the label adhesive.
- Record the following information on the label and in the field notebook (See SOPs FD-001 and FD-003):
    - Project number
    - Sample identification (i.e. MW-201 or SS-2)
    - Date and time (military time) of collection
    - Sampler's initials
    - Analysis methods
    - Preservative, if present
- Pre-preserved laboratory jars are preferable and should be used whenever practicable. If sample jars are not pre-preserved, add preservative as appropriate.
- At each sampling location, samples should be collected in order of volatility, most volatile first. Samples collected for volatile analysis should be placed in sample containers immediately upon retrieval of the sample.
- Aqueous samples for volatile analysis should be collected without air bubbles.
- The collection and preservation method of soil samples for volatile analysis may depend on project, client, or state regulatory requirements. Check with your Project Manager and/or SOPs SM-001 and SM-002 where appropriate.

- Care must be taken to avoid getting soils on the threads of sample jars, which can cause a faulty seal.
- If compositing samples in the field, specify the basis for composite (i.e. volume, weight, spoon recovery, etc.) and record in the field book the procedure for compositing the sample.
- Once samples have been collected and labeled, place samples in a cooler with sufficient bagged ice or freezer packs (blue ice) (if allowed) to chill samples to 4°C. If using ice, use double-bagged ice.
- Complete the chain-of-custody (COC) (SOP FD-003).
- If transporting the samples by way of a shipper:
    i. The sample cooler should have water drains securely sealed with duct tape, both on the inside and outside of the cooler.
    ii. Place a layer of packing material on the bottom of the cooler as a cushion.
    iii. Individually wrap each sample bottle with bubble packing or suitable packing material and place the wrapped bottles upright in the cooler with sufficient packing material between samples to avoid breakage.
    iv. Methanol preserved samples for volatiles analysis should be packed so they remain upright with the soil completely covered by the methanol during transport.
    v. Place a layer of packing material on top of the sample bottles.
    vi. Place bagged ice or freezer packs on top of the packing material. Fill the remaining space in the cooler with packing material to eliminate the possibility of vertical movement of samples.
    vii. Place the completed and signed chain-of-custody form in a sealable plastic bag and place on top of the packing material in the cooler, or tape it to the inside lid of the cooler.
    viii. Fill out the appropriate shipping or courier forms and attach to the top or handle of the cooler. If necessary, place the proper shipping labels on the cooler. Have the courier sign the COC form (or write pickup by FEDEX, UPS, etc. with date and time). Place a signed and dated custody seal on the cooler.
- All samples should be submitted to the laboratory as soon as possible. In many cases, same day shipping will be required by the client or the project manager. Be clear on this before beginning the field work.
- A copy of the waybills should be kept by the field supervisor to track shipments if necessary.

3. Limitations

- If samples are shipped on a Friday, call the laboratory ahead of time to confirm that personnel will be at the laboratory to receive and log-in the samples.
- During warm weather, make sure to use plenty of ice in the shipping container.

- Field personnel should be aware of analyses which have short hold times and schedule sampling events and shipping accordingly. Shipment of samples for analyses with short hold times must be arranged for in advance. Refer to the project work plan, quality assurance project plan, or state/federal regulations for holding time and preservative information. Contact the laboratory ahead of time when shipping samples with short hold time to ensure the lab is prepared for these analyses.
- For glassware containing preservatives (e.g., HCl, HNO_3), take care not to overfill the container, thus flushing the preservative out of the bottle.
- Never composite samples for VOCs in the field. Collect individual aliquots and direct the laboratory to perform compositing, if needed.
- Collection of aqueous samples should not be performed over the opening of a monitoring well. Preservatives from overfilling, a marker pen or other objects could fall into the well.
- If the recharge volume for a monitoring well is low, completely fill all volatile vials and then collect the minimum sample volume required for each remaining analysis.
- During subsurface soil sampling, if the recovery from the split-spoon sample is inadequate, if appropriate, resample the bottom of the borehole to obtain proper sample volume.
- Laboratories will homogenize and test the contents of the sample container, unless directed otherwise. Samples should not contain rocks, twigs, leaves, etc… unless these materials are of interest.

4. References

New Jersey Department of Environmental Protection, Field Sampling Procedures Manual, August 2005.

Connecticut Department of Environmental Protection, Guidance for Collecting and Preserving Soil and Sediment Samples for Laboratory

Preservation Techniques for Volatile Organic Compound (VOC) Soil Sample Analyses, WSC#99-415. Massachusetts Department of Environmental Protection.

5. Contacts

Jennifer Belonsoff
Leslie Lombardo

STANDARD OPERATING PROCEDURE

SG-003 Sub-slab Soil Vapor Collection

1. Objective

This procedure outlines the general steps to collect sub-slab soil vapor samples. The site-specific Sampling and Analysis Work Plan should be consulted for proposed sample locations, sample depths, and sampling duration.

2. Execution

Permanent and temporary sub-slab soil vapor probes will be installed using the procedures outlined below. All sub-slab soil vapor probes will be installed using a direct-push drill rig (e.g., Geoprobe® or similar), hand auger, or manually using a slide hammer.

2.1. Document Field Conditions

Document pertinent field conditions prior to installation of any probe locations.

- Record weather information (precipitation, temperature, barometric pressure, relative humidity, wind speed, and wind direction) at the beginning of the sampling event. Record substantial changes to these conditions that may occur during the course of sampling. The information may be measured with on-site equipment or obtained from a reliable source of local measurements (e.g., a local airport). Data should be obtained for the past 24 to 48 hours. Record the indoor conditions (temperature, heating/cooling system active, windows open/closed, etc.).
- Measure the differential pressure at the building. Measure the indoor and outdoor barometric pressure using a high resolution device. Where possible, measure the sub-slab barometric pressure at the sampling point.
- If sampling near a commercial or industrial building, uses of volatile chemicals during normal operations of the facility should be identified.
- Indoor floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, heating, ventilating and air conditioning (HVAC) system air supply and return registers, compass orientation (North), footings that create separate foundation sections, and any other pertinent information should be completed;
- Outdoor plot sketches should be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas.
- Any pertinent observations should be recorded, such as odors and readings from field instrumentation.

2.2. Sub-Slab Soil Vapor Point Installation Specifications

Each sub-slab soil vapor point will be constructed as follows:

- Drill an approximately 3/8-inch hole through the slab. If necessary, advance the drill bit 2-3 inches into the sub-slab material to create an open cavity.
- Using dedicated inert Teflon or stainless steel tubing of laboratory or food grade quality, insert the inlet of the tubing to the specified depth below the slab. For permanent installation, only stainless steel tubing and fittings will be used.
- For permanent point installations, the annular space surrounding the vapor probe tip will be filled with a porous backfill material (e.g., glass beads or coarse silica sand) to cover 1-inch of the above the tip of the probe.
- Seal the annular space between the hole and the tubing using an inert non-shrinking sealant such as melted 100% beeswax, permagum grout, putty, etc. For permanent installations, cement may be used.
- For permanent points, a protective casing will be set around the top of the point tubing and grouted in place minimize infiltration of water or ambient air, as well as to prevent accidental damage to he permanent point.
- The tubing top will be fitted with a Swagelok® and cap to prevent moisture and foreign material from infiltrating the tubing.

In cases where sub-slab sampling is impractical or infeasible, a surrogate location (attached garage, concrete patio, asphalt driveway, etc.) may be used if it is representative of sub-slab conditions. In surrogate locations, the vapor sampling point may be installed in accordance with SOP SG-002 Soil Vapor Collection.

2.3. Sub-Slab Soil Vapor Sample Collection

Sub-slab soil vapor samples will be collected as indicated in the site-specific Sampling and Analysis Work Plan and in accordance with state or Federal guidance documents. Specifically, sub-slab samples from the points will be collected as follows:

- Document pertinent field conditions prior to sampling as described above.
- A suction pump will be used to remove one to three implant volumes from the sub-slab soil vapor points prior to sampling. Include the volume of any additional tubing added to affix sampling equipment and the annular space between the probe and the native material if sand or glass beads were used.
- The purge rate shall not exceed 0.2 liters per minute.
- Samples will be collected in an individually laboratory certified clean 1-liter SUMMA® canister (or equivalent) using a certified flow controller calibrated for the anticipated sample duration (4 minutes). The regulator flow rate will not exceed 0.2 liters per minute.
- A helium tracer gas will be used to identify any potential migration or short circuiting of ambient air during sampling as described below.

- Remove the protective brass plug from the canister. Connect the pre-calibrated flow controller to the canister.
- Record the identification numbers for the canister and flow controller.
- Record the initial canister pressure on the vacuum gauge (check equipment-specific instructions for taking this measurement). A canister with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling. Record these numbers and values on the chain-of-custody form for each sample.
- Connect the tubing from the sub-slab soil vapor probe to the flow controller.
- Open the valve on the canister. Record the time that the valve was opened (beginning of sampling) and the canister pressure on the vacuum gauge.
- Photograph the canister and the area surrounding the canister.
- Monitor the vacuum pressure in the canister routinely during sampling.
- Stop sample collection when the canister still has a minimum amount of vacuum remaining. Check with the laboratory supplying the canister and flow controller for the ideal final vacuum pressure. Typically, the minimum vacuum is between 2 and 5 inches of mercury, but not zero. If there is no vacuum remaining, the sample will be rejected and collected again in a new canister.
- Record the final vacuum pressure and close the canister valve. Record the date and time that sample collection was stopped.
- Remove the flow controller from the canister and replace the protective brass plug.
- Attach labels/tags (sample name, time/date of sampling, etc.) to the canister as directed by the laboratory.
- Place the canister and other laboratory-supplied equipment in the packaging provided by the laboratory.
- Enter the information required for each sample on the chain-of-custody form, making sure to include the identification numbers for the canister and flow controller, and the initial and final canister pressures on the vacuum gauge.
- Samples will be analyzed for volatile organic compounds (VOCs) and naphthalene via modified USEPA modified Method TO-15 and helium via ASTM D-1945
- Include the required copies of the chain-of-custody form in the shipping packaging, as directed by the laboratory. Maintain a copy of the chain-of-custody for the project file.
- Deliver or ship the samples to the laboratory as soon as practical.
- All laboratory analytical data will be validated by a data validation professional in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, January 2005 and the USEPA Region II Standard Operating Procedure (SOP) for the Validation of Organic Data modified to accommodate the USEPA Method TO-15 and natural gas analysis by ASTM D-1945.

2.4. Tracer Gas Evaluation

The tracer gas evaluation provides a means to evaluate the integrity of the sub-slab soil vapor probe seal and assess the potential for introduction of indoor air into the sub-slab soil vapor sample. A tracer gas evaluation should be conducted on the each temporary sub-slab soil vapor probe to be sampled in a sampling event. A tracer gas evaluation should be conducted on the each permanent sub-slab soil vapor probe during the initial sampling event and a minimum of 10% of the sub-slab soil vapor probes during subsequent sampling events.

The following tracer gas evaluation procedure uses helium as a tracer gases which can be measured through laboratory analysis or by a portable detector.

- Retain the tracer gas around the sub-slab sample probe by filling an air-tight chamber (such as a plastic bucket) positioned over the sample location.
- Make sure the chamber is suitably sealed to the ground surface.
- Introduce the tracer gas into the chamber. The chamber will have tubing at the top of the chamber to introduce the tracer gas into the chamber and a valved fitting at the bottom to let the ambient air out while introducing tracer gas. Close the valve after the chamber has been enriched with tracer gas at concentrations >10%.
- The chamber will have a gas-tight fitting or sealable penetration to allow the sub-slab soil vapor sample probe tubing to pass through and exit the chamber.
- After the chamber has been filled with tracer gas, attach the sample probe tubing to a pump that will be pre-calibrated to extract sub-slab soil vapor at a rate of no more than 0.2 lpm. Purge the tubing using the pump. Calculate the volume of air in the tubing and purge one to three tubing volumes prior collecting an analytical sample or using a portable device to measuring the tracer gas concentration.
- Samples collected from vapor points during a tracer gas evaluation will be analyzed for VOCs and naphthalene via modified USEPA modified Method TO-15 and helium via ASTM D-1945.
- Alternately, a tracer gas detector may be used to verify the presence of the tracer gas in the chamber by affixing it to the valve fitting at the bottom of the chamber. The tracer gas detector may also be used to measure the tracer gas concentration in the pump exhaust during purging. If used, then record the tracer gas concentrations in the chamber and in the soil vapor sample.
- Based on the concentrations of the tracer gas detected during analysis or direct measurement, determine whether additional gas tracer evaluations are necessary:

If the evaluation on a probe indicates a high concentration of tracer gas in the sample (>10% of the concentration of the tracer gas in the chamber), then the

surface seal is not sufficient and requires improvement via repair or replacement prior to commencement subsequent sample collection.

A non-detectable level of tracer gas is preferred; however, if the evaluation on a probe indicates a low potential for introduction of ambient air into the sample (<10% of the concentration of the tracer gas in the chamber), then proceed with the soil vapor sampling. While lower concentrations of tracer gas are acceptable, the impact of the detectable leak on sample results should be evaluated in the sampling report.

3. References

USEPA modified Method TO-15 and helium via ASTM D-1945.

Section 2.7.1 of the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

4. Contact

Chris Berotti

Attachment 2
COC

NEW YORK CHAIN OF CUSTODY

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

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

ALPHA Job #

Client Information

Client:
Address:
Phone:
Fax:
Email:

Project Information

Project Name:
Project Location:
Project #
(Use Project name as Project #) ☐
Project Manager:
ALPHAQuote #:

Turn-Around Time

Standard ☐ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information

☐ Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☐ **Done**
☐ **Lab to do**
Preservation
☐ **Lab to do**
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Total Bottle	Sample Specific Comments

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
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:	Date/Time	Received By:	Date/Time

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.)

Form No: 01-25 HC (rev. 30-Sept-2013)

APPENDIX I

LABORATORY LIMITS

Date Created: 11/03/23
Created By: Melissa Deyo
File: PM15503-1
Page: 1

NYTCL Semivolatiles -EPA 8270E-SIM (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	0.1001	0.01442168	ug/l	40-140	40	40-140	40	40			
2-Chloronaphthalene	91-58-7	0.2002	0.01804712	ug/l	40-140	40	40-140	40	40			
Fluoranthene	206-44-0	0.1001	0.02054052	ug/l	40-140	40	40-140	40	40			
Hexachlorobutadiene	87-68-3	0.5005	0.04674852	ug/l	40-140	40	40-140	40	40			
Naphthalene	91-20-3	0.1001	0.04882696	ug/l	40-140	40	40-140	40	40			
Benzo(a)anthracene	56-55-3	0.1001	0.0198198	ug/l	40-140	40	40-140	40	40			
Benzo(a)pyrene	50-32-8	0.1001	0.01493856	ug/l	40-140	40	40-140	40	40			
Benzo(b)fluoranthene	205-99-2	0.1001	0.01156792	ug/l	40-140	40	40-140	40	40			
Benzo(k)fluoranthene	207-08-9	0.1001	0.00889616	ug/l	40-140	40	40-140	40	40			
Chrysene	218-01-9	0.1001	0.01198288	ug/l	40-140	40	40-140	40	40			
Acenaphthylene	208-96-8	0.1001	0.01222676	ug/l	40-140	40	40-140	40	40			
Anthracene	120-12-7	0.1001	0.01450176	ug/l	40-140	40	40-140	40	40			
Benzo(ghi)perylene	191-24-2	0.1001	0.01365	ug/l	40-140	40	40-140	40	40			
Fluorene	86-73-7	0.1001	0.01456364	ug/l	40-140	40	40-140	40	40			
Phenanthrene	85-01-8	0.1001	0.02333604	ug/l	40-140	40	40-140	40	40			
Dibenzo(a,h)anthracene	53-70-3	0.1001	0.0127218	ug/l	40-140	40	40-140	40	40			
Indeno(1,2,3-cd)Pyrene	193-39-5	0.1001	0.01217216	ug/l	40-140	40	40-140	40	40			
Pyrene	129-00-0	0.1001	0.01902264	ug/l	40-140	40	40-140	40	40			
2-Methylnaphthalene	91-57-6	0.1001	0.02192372	ug/l	40-140	40	40-140	40	40			
Pentachlorophenol	87-86-5	0.8008	0.0143416	ug/l	40-140	40	40-140	40	40			
Hexachlorobenzene	118-74-1	0.8008	0.00938028	ug/l	40-140	40	40-140	40	40			
Hexachloroethane	67-72-1	0.8008	0.06320132	ug/l	40-140	40	40-140	40	40			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 11/03/23
Created By: Melissa Deyo
File: PM15503-1
Page: 1

TCL Volatiles - EPA 8260D (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	0.5393	ug/l	70-130	20	70-130	20	20			
1,1-Dichloroethane	75-34-3	0.75	0.2156	ug/l	70-130	20	70-130	20	20			
Chloroform	67-66-3	0.75	0.1978	ug/l	70-130	20	70-130	20	20			
Carbon tetrachloride	56-23-5	0.5	0.1652	ug/l	63-132	20	63-132	20	20			
1,2-Dichloropropane	78-87-5	1.75	0.2958	ug/l	70-130	20	70-130	20	20			
Dibromochloromethane	124-48-1	0.5	0.1895	ug/l	63-130	20	63-130	20	20			
1,1,2-Trichloroethane	79-00-5	0.75	0.2615	ug/l	70-130	20	70-130	20	20			
Tetrachloroethene	127-18-4	0.5	0.1813	ug/l	70-130	20	70-130	20	20			
Chlorobenzene	108-90-7	0.5	0.1925	ug/l	75-130	20	75-130	20	20			
Trichlorofluoromethane	75-69-4	2.5	0.2667	ug/l	62-150	20	62-150	20	20			
1,2-Dichloroethane	107-06-2	0.5	0.1595	ug/l	70-130	20	70-130	20	20			
1,1,1-Trichloroethane	71-55-6	0.5	0.158	ug/l	67-130	20	67-130	20	20			
Bromodichloromethane	75-27-4	0.5	0.1924	ug/l	67-130	20	67-130	20	20			
trans-1,3-Dichloropropene	10061-02-6	0.5	0.1643	ug/l	70-130	20	70-130	20	20			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.1436	ug/l	70-130	20	70-130	20	20			
Bromoform	75-25-2	2	0.2477	ug/l	54-136	20	54-136	20	20			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.1915	ug/l	67-130	20	67-130	20	20			
Benzene	71-43-2	0.5	0.194	ug/l	70-130	20	70-130	20	20			
Toluene	108-88-3	0.75	0.2269	ug/l	70-130	20	70-130	20	20			
Ethylbenzene	100-41-4	0.5	0.265	ug/l	70-130	20	70-130	20	20			
Chloromethane	74-87-3	2.5	0.2815	ug/l	64-130	20	64-130	20	20			
Bromomethane	74-83-9	1	0.2563	ug/l	39-139	20	39-139	20	20			
Vinyl chloride	75-01-4	1	0.2241	ug/l	55-140	20	55-140	20	20			
Chloroethane	75-00-3	1	0.2335	ug/l	55-138	20	55-138	20	20			
1,1-Dichloroethene	75-35-4	0.5	0.1811	ug/l	61-145	20	61-145	20	20			
trans-1,2-Dichloroethene	156-60-5	0.75	0.2108	ug/l	70-130	20	70-130	20	20			
Trichloroethene	79-01-6	0.5	0.1746	ug/l	70-130	20	70-130	20	20			
1,2-Dichlorobenzene	95-50-1	2.5	0.1836	ug/l	70-130	20	70-130	20	20			
1,3-Dichlorobenzene	541-73-1	2.5	0.1863	ug/l	70-130	20	70-130	20	20			
1,4-Dichlorobenzene	106-46-7	2.5	0.215	ug/l	70-130	20	70-130	20	20			
Methyl tert butyl ether	1634-04-4	1	0.16	ug/l	63-130	20	63-130	20	20			
p/m-Xylene	179601-23-1	1	0.3477	ug/l	70-130	20	70-130	20	20			
o-Xylene	95-47-6	1	0.3297	ug/l	70-130	20	70-130	20	20			
cis-1,2-Dichloroethene	156-59-2	0.5	0.1866	ug/l	70-130	20	70-130	20	20			
Styrene	100-42-5	1	0.3591	ug/l	70-130	20	70-130	20	20			
Dichlorodifluoromethane	75-71-8	5	0.2999	ug/l	36-147	20	36-147	20	20			
Acetone	67-64-1	5	1.5606	ug/l	58-148	20	58-148	20	20			
Carbon disulfide	75-15-0	5	0.2995	ug/l	51-130	20	51-130	20	20			
2-Butanone	78-93-3	5	1.9386	ug/l	63-138	20	63-138	20	20			
4-Methyl-2-pentanone	108-10-1	5	0.4162	ug/l	59-130	20	59-130	20	20			
2-Hexanone	591-78-6	5	0.5783	ug/l	57-130	20	57-130	20	20			
Bromochloromethane	74-97-5	2.5	0.3295	ug/l	70-130	20	70-130	20	20			

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TCL Volatiles - EPA 8260D (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,2-Dibromoethane	106-93-4	2	0.1929	ug/l	70-130	20	70-130	20	20			
n-Butylbenzene	104-51-8	0.5	0.1961	ug/l	53-136	20	53-136	20	20			
sec-Butylbenzene	135-98-8	0.5	0.1806	ug/l	70-130	20	70-130	20	20			
tert-Butylbenzene	98-06-6	2.5	0.3016	ug/l	70-130	20	70-130	20	20			
1,2-Dibromo-3-chloropropane	96-12-8	2.5	0.327	ug/l	41-144	20	41-144	20	20			
Isopropylbenzene	98-82-8	0.5	0.187	ug/l	70-130	20	70-130	20	20			
p-Isopropyltoluene	99-87-6	0.5	0.1885	ug/l	70-130	20	70-130	20	20			
Naphthalene	91-20-3	2.5	0.2174	ug/l	70-130	20	70-130	20	20			
n-Propylbenzene	103-65-1	0.5	0.1734	ug/l	69-130	20	69-130	20	20			
1,2,3-Trichlorobenzene	87-61-6	2.5	0.2338	ug/l	70-130	20	70-130	20	20			
1,2,4-Trichlorobenzene	120-82-1	2.5	0.2197	ug/l	70-130	20	70-130	20	20			
1,3,5-Trimethylbenzene	108-67-8	2.5	0.2105	ug/l	64-130	20	64-130	20	20			
1,2,4-Trimethylbenzene	95-63-6	2.5	0.2678	ug/l	70-130	20	70-130	20	20			
Methyl Acetate	79-20-9	10	10	ug/l	70-130	20	70-130	20	20			
Cyclohexane	110-82-7	10	0.2448	ug/l	70-130	20	70-130	20	20			
1,4-Dioxane	123-91-1	250	75.7059	ug/l	56-162	20	56-162	20	20			
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	10	0.2337	ug/l	70-130	20	70-130	20	20			
Methyl cyclohexane	108-87-2	10	10	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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NYTCL Semivolatiles - EPA 8270E (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	2.002	0.44408	ug/l	37-111	30	37-111	30	30			
1,2,4-Trichlorobenzene	120-82-1	5.0232	0.49868	ug/l	39-98	30	39-98	30	30			
Hexachlorobenzene	118-74-1	2.002	0.46592	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethyl)ether	111-44-4	2.002	0.50596	ug/l	40-140	30	40-140	30	30			
2-Chloronaphthalene	91-58-7	2.002	0.4368	ug/l	40-140	30	40-140	30	30			
1,2-Dichlorobenzene	95-50-1	2.002	0.455	ug/l	40-140	30	40-140	30	30			
1,3-Dichlorobenzene	541-73-1	2.002	0.40404	ug/l	40-140	30	40-140	30	30			
1,4-Dichlorobenzene	106-46-7	2.002	0.43316	ug/l	36-97	30	36-97	30	30			
3,3'-Dichlorobenzidine	91-94-1	5.0232	1.62344	ug/l	40-140	30	40-140	30	30			
2,4-Dinitrotoluene	121-14-2	5.0232	1.1648	ug/l	48-143	30	48-143	30	30			
2,6-Dinitrotoluene	606-20-2	5.0232	0.93184	ug/l	40-140	30	40-140	30	30			
Fluoranthene	206-44-0	2.002	0.257348	ug/l	40-140	30	40-140	30	30			
4-Chlorophenyl phenyl ether	7005-72-3	2.002	0.48776	ug/l	40-140	30	40-140	30	30			
4-Bromophenyl phenyl ether	101-55-3	2.002	0.37856	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroisopropyl)ether	108-60-1	2.002	0.5278	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethoxy)methane	111-91-1	5.0232	0.50232	ug/l	40-140	30	40-140	30	30			
Hexachlorobutadiene	87-68-3	2.002	0.65884	ug/l	40-140	30	40-140	30	30			
Hexachlorocyclopentadiene	77-47-4	20.02	0.68796	ug/l	40-140	30	40-140	30	30			
Hexachloroethane	67-72-1	2.002	0.58604	ug/l	40-140	30	40-140	30	30			
Isophorone	78-59-1	5.0232	1.20484	ug/l	40-140	30	40-140	30	30			
Naphthalene	91-20-3	2.002	0.46592	ug/l	40-140	30	40-140	30	30			
Nitrobenzene	98-95-3	2.002	0.77168	ug/l	40-140	30	40-140	30	30			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	2.002	0.4186	ug/l	40-140	30	40-140	30	30			
n-Nitrosodi-n-propylamine	621-64-7	5.0232	0.64428	ug/l	29-132	30	29-132	30	30			
Bis(2-Ethylhexyl)phthalate	117-81-7	3.003	1.53608	ug/l	40-140	30	40-140	30	30			
Butyl benzyl phthalate	85-68-7	5.0232	1.17208	ug/l	40-140	30	40-140	30	30			
Di-n-butylphthalate	84-74-2	5.0232	0.38948	ug/l	40-140	30	40-140	30	30			
Di-n-octylphthalate	117-84-0	5.0232	1.274	ug/l	40-140	30	40-140	30	30			
Diethyl phthalate	84-66-2	5.0232	0.3822	ug/l	40-140	30	40-140	30	30			
Dimethyl phthalate	131-11-3	5.0232	1.82	ug/l	40-140	30	40-140	30	30			
Benzo(a)anthracene	56-55-3	2.002	0.32578	ug/l	40-140	30	40-140	30	30			
Benzo(a)pyrene	50-32-8	2.002	0.40768	ug/l	40-140	30	40-140	30	30			
Benzo(b)fluoranthene	205-99-2	2.002	0.355264	ug/l	40-140	30	40-140	30	30			
Benzo(k)fluoranthene	207-08-9	2.002	0.37492	ug/l	40-140	30	40-140	30	30			
Chrysene	218-01-9	2.002	0.341068	ug/l	40-140	30	40-140	30	30			
Acenaphthylene	208-96-8	2.002	0.46592	ug/l	45-123	30	45-123	30	30			
Anthracene	120-12-7	2.002	0.32942	ug/l	40-140	30	40-140	30	30			
Benzo(ghi)perylene	191-24-2	2.002	0.296296	ug/l	40-140	30	40-140	30	30			
Fluorene	86-73-7	2.002	0.41496	ug/l	40-140	30	40-140	30	30			
Phenanthrene	85-01-8	2.002	0.33124	ug/l	40-140	30	40-140	30	30			
Dibenzo(a,h)anthracene	53-70-3	2.002	0.323232	ug/l	40-140	30	40-140	30	30			
Indeno(1,2,3-cd)Pyrene	193-39-5	2.002	0.39676	ug/l	40-140	30	40-140	30	30			

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NYTCL Semivolatiles - EPA 8270E (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	2.002	0.279552	ug/l	26-127	30	26-127	30	30			
Biphenyl	92-52-4	2.002	0.45864	ug/l	40-140	30	40-140	30	30			
4-Chloroaniline	106-47-8	5.0232	1.07016	ug/l	40-140	30	40-140	30	30			
2-Nitroaniline	88-74-4	5.0232	0.49868	ug/l	52-143	30	52-143	30	30			
3-Nitroaniline	99-09-2	5.0232	0.81536	ug/l	25-145	30	25-145	30	30			
4-Nitroaniline	100-01-6	5.0232	0.8008	ug/l	51-143	30	51-143	30	30			
Dibenzofuran	132-64-9	2.002	0.49868	ug/l	40-140	30	40-140	30	30			
2-Methylnaphthalene	91-57-6	2.002	0.455	ug/l	40-140	30	40-140	30	30			
Acetophenone	98-86-2	5.0232	0.5278	ug/l	39-129	30	39-129	30	30			
2,4,6-Trichlorophenol	88-06-2	5.0232	0.61152	ug/l	30-130	30	30-130	30	30			
P-Chloro-M-Cresol	59-50-7	2.002	0.35126	ug/l	23-97	30	23-97	30	30			
2-Chlorophenol	95-57-8	2.002	0.48048	ug/l	27-123	30	27-123	30	30			
2,4-Dichlorophenol	120-83-2	5.0232	0.41132	ug/l	30-130	30	30-130	30	30			
2,4-Dimethylphenol	105-67-9	5.0232	1.77996	ug/l	30-130	30	30-130	30	30			
2-Nitrophenol	88-75-5	10.01	0.84812	ug/l	30-130	30	30-130	30	30			
4-Nitrophenol	100-02-7	10.01	0.6734	ug/l	10-80	30	10-80	30	30			
2,4-Dinitrophenol	51-28-5	20.02	6.6612	ug/l	20-130	30	20-130	30	30			
4,6-Dinitro-o-cresol	534-52-1	10.01	1.81636	ug/l	20-164	30	20-164	30	30			
Pentachlorophenol	87-86-5	10.01	1.79452	ug/l	9-103	30	9-103	30	30			
Phenol	108-95-2	5.0232	0.56784	ug/l	12-110	30	12-110	30	30			
2-Methylphenol	95-48-7	5.0232	0.4914	ug/l	30-130	30	30-130	30	30			
3-Methylphenol/4-Methylphenol	106-44-5	5.0232	0.48048	ug/l	30-130	30	30-130	30	30			
2,4,5-Trichlorophenol	95-95-4	5.0232	0.77532	ug/l	30-130	30	30-130	30	30			
Benzoic Acid	65-85-0	50.232	2.66084	ug/l	10-164	30	10-164	30	30			
Benzyl Alcohol	100-51-6	2.002	0.58968	ug/l	26-116	30	26-116	30	30			
Carbazole	86-74-8	2.002	0.4914	ug/l	55-144	30	55-144	30	30			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

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Method	Analyte	Units	Reporting Limit		Method	Analyte	Units	Reporting Limit
TO15	1,1,2,2-Tetrachloroethane	ug/m3	1.37		TO15	1,1,2,2-Tetrachloroethane	ppbV	0.2
TO15	1,1,2-Trichloroethane	ug/m3	1.09		TO15	1,1,2-Trichloroethane	ppbV	0.2
TO15	1,1-Dichloroethane	ug/m3	0.809		TO15	1,1-Dichloroethane	ppbV	0.2
TO15	1,2,4-Trichlorobenzene	ug/m3	1.48		TO15	1,2,4-Trichlorobenzene	ppbV	0.2
TO15	1,2,4-Trimethylbenzene	ug/m3	0.983		TO15	1,2,4-Trimethylbenzene	ppbV	0.2
TO15	1,2-Dibromoethane	ug/m3	1.54		TO15	1,2-Dibromoethane	ppbV	0.2
TO15	1,2-Dichlorobenzene	ug/m3	1.2		TO15	1,2-Dichlorobenzene	ppbV	0.2
TO15	1,2-Dichloroethane	ug/m3	0.809		TO15	1,2-Dichloroethane	ppbV	0.2
TO15	1,2-Dichloropropane	ug/m3	0.924		TO15	1,2-Dichloropropane	ppbV	0.2
TO15	1,3,5-Trimethylbenzene	ug/m3	0.983		TO15	1,3,5-Trimethylbenzene	ppbV	0.2
TO15	1,3-Butadiene	ug/m3	0.442		TO15	1,3-Butadiene	ppbV	0.2
TO15	1,3-Dichlorobenzene	ug/m3	1.2		TO15	1,3-Dichlorobenzene	ppbV	0.2
TO15	1,4-Dichlorobenzene	ug/m3	1.2		TO15	1,4-Dichlorobenzene	ppbV	0.2
TO15	1,4-Dioxane	ug/m3	0.721		TO15	1,4-Dioxane	ppbV	0.2
TO15	2,2,4-Trimethylpentane	ug/m3	0.934		TO15	2,2,4-Trimethylpentane	ppbV	0.2
TO15	2-Butanone	ug/m3	1.47		TO15	2-Butanone	ppbV	0.5
TO15	2-Hexanone	ug/m3	0.82		TO15	2-Hexanone	ppbV	0.2
TO15	3-Chloropropene	ug/m3	0.626		TO15	3-Chloropropene	ppbV	0.2
TO15	4-Ethyltoluene	ug/m3	0.983		TO15	4-Ethyltoluene	ppbV	0.2
TO15	4-Methyl-2-pentanone	ug/m3	2.05		TO15	4-Methyl-2-pentanone	ppbV	0.5
TO15	Acetone	ug/m3	2.38		TO15	Acetone	ppbV	1
TO15	Benzene	ug/m3	0.639		TO15	Benzene	ppbV	0.2
TO15	Benzyl chloride	ug/m3	1.04		TO15	Benzyl chloride	ppbV	0.2
TO15	Bromodichloromethane	ug/m3	1.34		TO15	Bromodichloromethane	ppbV	0.2
TO15	Bromoform	ug/m3	2.07		TO15	Bromoform	ppbV	0.2
TO15	Bromomethane	ug/m3	0.777		TO15	Bromomethane	ppbV	0.2
TO15	Carbon disulfide	ug/m3	0.623		TO15	Carbon disulfide	ppbV	0.2
TO15	Chlorobenzene	ug/m3	0.921		TO15	Chlorobenzene	ppbV	0.2
TO15	Chloroethane	ug/m3	0.528		TO15	Chloroethane	ppbV	0.2
TO15	Chloroform	ug/m3	0.977		TO15	Chloroform	ppbV	0.2
TO15	Chloromethane	ug/m3	0.413		TO15	Chloromethane	ppbV	0.2
TO15	cis-1,3-Dichloropropene	ug/m3	0.908		TO15	cis-1,3-Dichloropropene	ppbV	0.2
TO15	Cyclohexane	ug/m3	0.688		TO15	Cyclohexane	ppbV	0.2
TO15	Dibromochloromethane	ug/m3	1.7		TO15	Dibromochloromethane	ppbV	0.2
TO15	Dichlorodifluoromethane	ug/m3	0.989		TO15	Dichlorodifluoromethane	ppbV	0.2
TO15	Ethanol	ug/m3	9.42		TO15	Ethanol	ppbV	5
TO15	Ethyl Acetate	ug/m3	1.8		TO15	Ethyl Acetate	ppbV	0.5
TO15	Ethylbenzene	ug/m3	0.869		TO15	Ethylbenzene	ppbV	0.2
TO15	Freon-113	ug/m3	1.53		TO15	Freon-113	ppbV	0.2
TO15	Freon-114	ug/m3	1.4		TO15	Freon-114	ppbV	0.2
TO15	Heptane	ug/m3	0.82		TO15	Heptane	ppbV	0.2
TO15	Hexachlorobutadiene	ug/m3	2.13		TO15	Hexachlorobutadiene	ppbV	0.2
TO15	Isopropanol	ug/m3	1.23		TO15	Isopropanol	ppbV	0.5
TO15	Methyl tert butyl ether	ug/m3	0.721		TO15	Methyl tert butyl ether	ppbV	0.2
TO15	Methylene chloride	ug/m3	1.74		TO15	Methylene chloride	ppbV	0.5
TO15	n-Hexane	ug/m3	0.705		TO15	n-Hexane	ppbV	0.2
TO15	o-Xylene	ug/m3	0.869		TO15	o-Xylene	ppbV	0.2
TO15	p/m-Xylene	ug/m3	1.74		TO15	p/m-Xylene	ppbV	0.4
TO15	Styrene	ug/m3	0.852		TO15	Styrene	ppbV	0.2
TO15	Tertiary butyl Alcohol	ug/m3	1.52		TO15	Tertiary butyl Alcohol	ppbV	0.5
TO15	Tetrahydrofuran	ug/m3	1.47		TO15	Tetrahydrofuran	ppbV	0.5
TO15	Toluene	ug/m3	0.754		TO15	Toluene	ppbV	0.2
TO15	trans-1,2-Dichloroethene	ug/m3	0.793		TO15	trans-1,2-Dichloroethene	ppbV	0.2
TO15	trans-1,3-Dichloropropene	ug/m3	0.908		TO15	trans-1,3-Dichloropropene	ppbV	0.2
TO15	Trichlorofluoromethane	ug/m3	1.12		TO15	Trichlorofluoromethane	ppbV	0.2
TO15	Vinyl bromide	ug/m3	0.874		TO15	Vinyl bromide	ppbV	0.2
TO15-SIM	1,1,1-Trichloroethane	ug/m3	0.109		TO15-SIM	1,1,1-Trichloroethane	ppbV	0.02
TO15-SIM	1,1-Dichloroethene	ug/m3	0.079		TO15-SIM	1,1-Dichloroethene	ppbV	0.02
TO15-SIM	Carbon tetrachloride	ug/m3	0.126		TO15-SIM	Carbon tetrachloride	ppbV	0.02
TO15-SIM	cis-1,2-Dichloroethene	ug/m3	0.079		TO15-SIM	cis-1,2-Dichloroethene	ppbV	0.02
TO15-SIM	Tetrachloroethene	ug/m3	0.136		TO15-SIM	Tetrachloroethene	ppbV	0.02
TO15-SIM	Trichloroethene	ug/m3	0.107		TO15-SIM	Trichloroethene	ppbV	0.02
TO15-SIM	Vinyl chloride	ug/m3	0.051		TO15-SIM	Vinyl chloride	ppbV	0.02

Method	Analyte	Units	Reporting Limit		Method	Analyte	Units	Reporting Limit
TO15	1,1,1-Trichloroethane	1.09	ug/m3		TO15	1,1,1-Trichloroethane	0.2	ppbV
TO15	1,1,2,2-Tetrachloroethane	1.37	ug/m3		TO15	1,1,2,2-Tetrachloroethane	0.2	ppbV
TO15	1,1,2-Trichloroethane	1.09	ug/m3		TO15	1,1,2-Trichloroethane	0.2	ppbV
TO15	1,1-Dichloroethane	0.809	ug/m3		TO15	1,1-Dichloroethane	0.2	ppbV
TO15	1,1-Dichloroethene	0.793	ug/m3		TO15	1,1-Dichloroethene	0.2	ppbV
TO15	1,2,4-Trichlorobenzene	1.48	ug/m3		TO15	1,2,4-Trichlorobenzene	0.2	ppbV
TO15	1,2,4-Trimethylbenzene	0.983	ug/m3		TO15	1,2,4-Trimethylbenzene	0.2	ppbV
TO15	1,2-Dibromoethane	1.54	ug/m3		TO15	1,2-Dibromoethane	0.2	ppbV
TO15	1,2-Dichlorobenzene	1.2	ug/m3		TO15	1,2-Dichlorobenzene	0.2	ppbV
TO15	1,2-Dichloroethane	0.809	ug/m3		TO15	1,2-Dichloroethane	0.2	ppbV
TO15	1,2-Dichloropropane	0.924	ug/m3		TO15	1,2-Dichloropropane	0.2	ppbV
TO15	1,3,5-Trimethylbenzene	0.983	ug/m3		TO15	1,3,5-Trimethylbenzene	0.2	ppbV
TO15	1,3-Butadiene	0.442	ug/m3		TO15	1,3-Butadiene	0.2	ppbV
TO15	1,3-Dichlorobenzene	1.2	ug/m3		TO15	1,3-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dichlorobenzene	1.2	ug/m3		TO15	1,4-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dioxane	0.721	ug/m3		TO15	1,4-Dioxane	0.2	ppbV
TO15	2,2,4-Trimethylpentane	0.934	ug/m3		TO15	2,2,4-Trimethylpentane	0.2	ppbV
TO15	2-Butanone	1.47	ug/m3		TO15	2-Butanone	0.5	ppbV
TO15	2-Hexanone	0.82	ug/m3		TO15	2-Hexanone	0.2	ppbV
TO15	3-Chloropropene	0.626	ug/m3		TO15	3-Chloropropene	0.2	ppbV
TO15	4-Ethyltoluene	0.983	ug/m3		TO15	4-Ethyltoluene	0.2	ppbV
TO15	4-Methyl-2-pentanone	2.05	ug/m3		TO15	4-Methyl-2-pentanone	0.5	ppbV
TO15	Acetone	2.38	ug/m3		TO15	Acetone	1	ppbV
TO15	Benzene	0.639	ug/m3		TO15	Benzene	0.2	ppbV
TO15	Benzyl chloride	1.04	ug/m3		TO15	Benzyl chloride	0.2	ppbV
TO15	Bromodichloromethane	1.34	ug/m3		TO15	Bromodichloromethane	0.2	ppbV
TO15	Bromoform	2.07	ug/m3		TO15	Bromoform	0.2	ppbV
TO15	Bromomethane	0.777	ug/m3		TO15	Bromomethane	0.2	ppbV
TO15	Carbon disulfide	0.623	ug/m3		TO15	Carbon disulfide	0.2	ppbV
TO15	Carbon tetrachloride	1.26	ug/m3		TO15	Carbon tetrachloride	0.2	ppbV
TO15	Chlorobenzene	0.921	ug/m3		TO15	Chlorobenzene	0.2	ppbV
TO15	Chloroethane	0.528	ug/m3		TO15	Chloroethane	0.2	ppbV
TO15	Chloroform	0.977	ug/m3		TO15	Chloroform	0.2	ppbV
TO15	Chloromethane	0.413	ug/m3		TO15	Chloromethane	0.2	ppbV
TO15	cis-1,2-Dichloroethene	0.793	ug/m3		TO15	cis-1,2-Dichloroethene	0.2	ppbV
TO15	cis-1,3-Dichloropropene	0.908	ug/m3		TO15	cis-1,3-Dichloropropene	0.2	ppbV
TO15	Cyclohexane	0.688	ug/m3		TO15	Cyclohexane	0.2	ppbV
TO15	Dibromochloromethane	1.7	ug/m3		TO15	Dibromochloromethane	0.2	ppbV
TO15	Dichlorodifluoromethane	0.989	ug/m3		TO15	Dichlorodifluoromethane	0.2	ppbV
TO15	Ethanol	9.42	ug/m3		TO15	Ethanol	5	ppbV
TO15	Ethyl Acetate	1.8	ug/m3		TO15	Ethyl Acetate	0.5	ppbV
TO15	Ethylbenzene	0.869	ug/m3		TO15	Ethylbenzene	0.2	ppbV
TO15	Freon-113	1.53	ug/m3		TO15	Freon-113	0.2	ppbV
TO15	Freon-114	1.4	ug/m3		TO15	Freon-114	0.2	ppbV
TO15	Heptane	0.82	ug/m3		TO15	Heptane	0.2	ppbV
TO15	Hexachlorobutadiene	2.13	ug/m3		TO15	Hexachlorobutadiene	0.2	ppbV
TO15	Isopropanol	1.23	ug/m3		TO15	Isopropanol	0.5	ppbV
TO15	Methyl tert butyl ether	0.721	ug/m3		TO15	Methyl tert butyl ether	0.2	ppbV
TO15	Methylene chloride	1.74	ug/m3		TO15	Methylene chloride	0.5	ppbV
TO15	n-Hexane	0.705	ug/m3		TO15	n-Hexane	0.2	ppbV
TO15	o-Xylene	0.869	ug/m3		TO15	o-Xylene	0.2	ppbV
TO15	p/m-Xylene	1.74	ug/m3		TO15	p/m-Xylene	0.4	ppbV
TO15	Styrene	0.852	ug/m3		TO15	Styrene	0.2	ppbV
TO15	Tertiary butyl Alcohol	1.52	ug/m3		TO15	Tertiary butyl Alcohol	0.5	ppbV
TO15	Tetrachloroethene	1.36	ug/m3		TO15	Tetrachloroethene	0.2	ppbV
TO15	Tetrahydrofuran	1.47	ug/m3		TO15	Tetrahydrofuran	0.5	ppbV
TO15	Toluene	0.754	ug/m3		TO15	Toluene	0.2	ppbV
TO15	trans-1,2-Dichloroethene	0.793	ug/m3		TO15	trans-1,2-Dichloroethene	0.2	ppbV
TO15	trans-1,3-Dichloropropene	0.908	ug/m3		TO15	trans-1,3-Dichloropropene	0.2	ppbV
TO15	Trichloroethene	1.07	ug/m3		TO15	Trichloroethene	0.2	ppbV
TO15	Trichlorofluoromethane	1.12	ug/m3		TO15	Trichlorofluoromethane	0.2	ppbV
TO15	Vinyl bromide	0.874	ug/m3		TO15	Vinyl bromide	0.2	ppbV
TO15	Vinyl chloride	0.511	ug/m3		TO15	Vinyl chloride	0.2	ppbV

APPENDIX J

OWNER RESPONSIBILITIES

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the 207th Street / 9th Avenue site (the "Site"), number C231102, are divided between the site owner(s) and a Remedial Party ("RP"), as defined below. The owner(s) is/are currently listed as:

HP Sherman Creek Housing Development Fund Co., Inc. (Jamie A. Smarr, jsmarr@housingpartnership.com) (the "owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term RP refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RPs are:

1. J.207 ST LLC
2. MFC Realty Corp.
3. 207 Street Owner LLC
4. Sherman Creek Master Tenant LLC
5. Sherman Creek Owner LLC
6. HP 3875 Ninth Avenue Housing Development Fund Company, Inc.
7. Sherman Creek LIHTC Owner, LLC
8. HP Sherman Creek Housing Development Fund Co. Inc.

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.
2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in a(n) Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 1.3-Notifications.

6) If some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in Section 1.3-Notifications and coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, any activity that may increase direct human or environmental exposure (e.g., day care, school or park). A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

9) There are currently no active vapor intrusion mitigation systems on the Site. If the site remedy requires the installation, operation, and/or maintenance of an on-site vapor intrusion mitigation system insert the following: Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.
2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, PRRs and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.
3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.
4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).
5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .
6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3- Notifications of the SMP.
7) If the soil vapor intrusion mitigation system is activated, the RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in the applicable Section or Appendix (Operation, Monitoring and Maintenance Manual) of the SMP.
8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.
9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

APPENDIX K

PERMITS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 2
47-40 21st Street, Long Island City, NY 11101
P: (718) 482-4997 I F: (718) 482-4975
www.dec.ny.gov

July 9, 2019

Kathryn Sommo
Roux Environmental Engineering and Geology, D.P.C.
209 Shafter St
Islandia, NY 11749

Re: DEC Permit No. 2-6201-00416/00001
Sherman Creek Commercial Development
3875 9th Ave
Manhattan, NY
ECL Article 25 -Tidal Wetlands
NOTICE OF PERMIT ISSUANCE

Dear Ms. Sommo:

Enclosed is your permit. Please read it carefully. You are required to comply with all conditions of the permit.

Pease note that Natural Resources Condition 3 of the permit requires submittal of the attached "Notice of Intent to Commence Work" at least 5 days prior to the start of the permitted activity. Also, please note that Natural Resources Condition 5 of the permit requires submittal of the attached "Notice of Completion of Work" within 10 days of the completion of work.

If you have any technical questions, please contact the Division of Marine Resources at (718) 482-6464. If you have any administrative questions please contact me at (718) 482-6429.

Sincerely,

Frances Knickmeyer
Environmental Analyst

PERMIT

Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
J 207 ST LLC
15 Verbena Ave 2nd fl
Floral Park, NY 11001
(516) 821-2004

Facility:
Sherman Creek Commercial Development
3875 9th Ave
New York, NY 10034

Facility Location: in NEW YORK COUNTY **Village:** Manhattan
Facility Principal Reference Point: NYTM-E: 591.27216152829 NYTM-N: 4524.18972773537
Latitude: 40°51'49.3" Longitude: 73°55'01.1"
Project Location: 3875 9th Ave. (Block 2188 Lot 1)
Authorized Activity: Development of a 1.9-acre site into a multi-use building facility, including a waterfront public access area which extends approximately 50 feet landward from apparent high water line. The project is partially located within regulated NYSDEC tidal wetlands adjacent area on the Harlem River.

Permit Authorizations

Tidal Wetlands - Under Article 25
Permit ID 2-6201-00416/00001
New Permit Effective Date: 7/9/2019 Expiration Date: 12/31/2024

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: STEPHEN A WATTS, Regional Permit Administrator
Address: NYSDEC Region 2 Headquarters
47-40 21st St
Long Island City, NY 11101 -5401

Authorized Signature: _____ Date 07 / 09 / 2019

Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: TIDAL WETLANDS

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by Aufgang Architects LLC as cited in Natural Resources Special Condtion 2.

2. **Conformance with Plans - Addenda** In addition to plans referenced in the Condition titled "Conformance with Plans," the activities authorized by this permit must be in strict conformance with the following approved plans and/or submissions made as part of the permit application:

   a. Project plans titled "Proposed Development for W.207th Street and 9th Avenue 3875 9th Ave. New York, NY 10304," Sheets 1-4 of 4, prepared by Aufgang Architects LLC, issue dated November 1, 2015, last revised May 22, 2019, and received by NYSDEC May 28, 2019.
   b. Project plans titled "Proposed New Development for West 207th Street and Exterior Street Waterfront," Drawing Nos. 5 - 21, prepared by Aufgang Architects LLC, issue dated May 14, 2019, and received by NYSDEC May 28, 2019.

3. **Notice of Intent to Commence Work** At least five (5) days prior to the start of work. Permittee must complete and submit the attached "Notice of Intent to Commence Work" form to the NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101.

4. **Post Permit Sign** The permit sign enclosed with this permit shall be posted in a conspicuous location on the worksite and adequately protected from the weather.

5. **Notice of Completion of Work** Within ten (10) days of the completion of work, Permittee must complete and submit the attached Notice of Completion of Work form to NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101.

6. **Post Construction Photographs** Within 10 days of the completion of work authorized by this permit, Permittee must submit post-construction photographs of the work area to: NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101.

7. **Notice Covenant** No later than thirty (30) days after issuance of this permit, Permittee must incorporate the following language as a notice covenant in the property records for Block 2188 Lot 1, County of New York, replacing the brackets and the text therein as required.

Within forty-five (45) days after the issuance of this permit, a copy of the covenanted deed along with the number assigned to this permit must be sent to: NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101 (Attention: Matthew James).

The following is the template for the notice covenant:

> THIS DECLARATION is made by [insert name], whose address is [insert mailing address], to be entered in the record for certain real property located in the Borough of [insert borough], City and State of New York, [insert county] County Tax Block [insert block] Lot [insert block].
>
> This parcel contains a tidal wetland and/or a tidal wetland adjacent area regulated by New York State laws and regulations. The New York State Department of Environmental Conservation ("NYSDEC") has jurisdiction over both tidal wetlands and tidal wetland adjacent areas, which generally measure 150 feet landward of the most landward boundary of a mapped tidal wetland. The official tidal wetlands maps can be viewed at NYSDEC Region 2 offices.
>
> The development of this parcel has been authorized under NYSDEC permit # 2-6201-00416/00001, which determines the extent of construction, including the extent of impervious surface area(s), for the parcel.
>
> Article 25 of the New York State Environmental Conservation Law (the Tidal Wetlands Act) provides that **anyone conducting a regulated activity within a tidal wetland or a tidal wetland adjacent area must first obtain a permit from NYSDEC**. Conducting a regulated activity without a permit constitutes a violation of the Tidal Wetlands Act. Any violation of the Tidal Wetlands Act can result in a significant penalty (at the time of this indenture up to $10,000 per day for each violation), as well as criminal sanctions and injunctive relief.
>
> Regulated activities include, but are not limited to:
>
> - any form of draining, dredging, excavation, or removal (directly or indirectly) of soil, mud, sand, shells, gravel, or other aggregate of any kind from any tidal wetland;
> - any form of dumping, filling, or depositing (directly or indirectly) of any soil, stones, sand, gravel, mud, rubbish, or fill of any kind;
> - the erection of any structures or roads, the driving of any pilings, or the placing of any other obstructions, whether or not changing the ebb and flow of the tide;
> - any other activity within or immediately adjacent to inventoried wetlands, which may substantially impair or alter the natural condition of the tidal wetland area; and
> - any subdivision of land.
>
> Anyone wishing to conduct any activity within a tidal wetland or a tidal wetland adjacent area should contact the NYSDEC Region 2 Marine Resources Program, prior to the commencement of such activity, to clarify whether an Article 25 permit is required.
>
> Signed, _____
> (insert name of landowner)
>
> State of New York)
>): ss.:
> County of Queens)

On this _____ day of _____ 20__, before me personally came (insert name[s] of landowner[s]), personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument, who being duly sworn deposed and stated that (s)he resides at

_____, and

that (s)he is the person described in and who executed the foregoing instrument.

_____
Notary Public

8. Best Management Practices Best management practices will be employed to prevent the loss of construction materials, debris and sediments from entering the wetlands or waterways. Such practices may include, but are not limited to construction fencing, staked hay bales, silt fencing, floating platforms, netting, and containment booms.

9. Dewatering If sediments are to be dewatered into waterways, best management practices, including but not limited to settling basins and filtration bags, must be used to prevent sediments from being released into wetlands and/or navigable waters. If at any time during dewatering a visible sediment plume is apparent, all dewatering must cease and sediment controls must be repaired/replaced before dewatering is allowed to continue.

10. Disturbed Soils All disturbed areas where soil will be temporarily exposed or stockpiled for longer than one (1) week will be contained be a continuous line of staked hay bales/silt curtain (or other NYSDEC approved method) placed on the seaward side between the fill and wetland or protected buffer area. Tarps are authorized to supplement these approved methods.

11. Erosion/Sediment Control All areas of soil disturbance resulting from this project will be stabilized immediately following project completion or prior to permit expiration, whichever comes first. The approved methodologies are as follows:

a. Stabilization of the entire disturbed area with appropriate vegetation (grasses, etc.).
b. Stabilized as per specifications identified on approved plans.
c. Temporarily stabilized with straw or hay mulch or jute matting or other similar natural fiber matting within 1 week of final grading. Temporary stabilization will be maintained until a mature vegetative cover is established.

12. Demolition and Construction Debris Should any demolition or construction debris fall into the waterway or enter the tidal wetlands, it must be removed immediately.

13. Disposal of Demolition and Construction Debris All demolition and construction debris must be properly disposed of at a licensed facility.

14. Concrete or Leachate Must Not Escape During construction, concrete or leachate will not escape or be discharged, nor will washings from transit mix trucks, mixers, or other devices enter any water body, including wetlands or protected buffer areas.

15. Fill Material All fill will consist of "clean" sand, gravel, or soil. The use of material such as asphalt, slag, fly-ash, recycled concrete aggregate (RCA), broken concrete, or demolition debris is strictly prohibited.

16. Storage of Equipment and Materials The storage of construction equipment and materials must be confined to within the project work site and or upland areas greater than 30 linear feet from the tidal wetland boundary.

17. Minimize Adverse Impacts to Wetlands, Wildlife, Water All work must be performed in a manner which minimizes adverse impacts to wetlands, wildlife, water quality, and natural resources.

18. No Interference With Navigation There shall be no unreasonable interference with navigation by the work herein authorized.

19. Precautions Against Contamination of Waters All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

20. Prior Approval of Changes If the Permittee desires to make any changes in construction techniques, species to be planted, the site plan, any mitigation plan, scheduling or staging of construction, or any other aspect of this project, the Permittee shall submit a written request to the Regional Permit Administrator to make such proposed changes and shall not make such changes unless authorized in writing by the Department.

21. Failure to Meet Permit Conditions Failure of the permittee to meet all the conditions of this permit is a violation of this permit and grounds for an order to immediately cease the permitted activity at the project site.

22. State May Require Site Restoration If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may lawfully require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

23. State May Order Removal or Alteration of Work If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

24. State Not Liable for Damage The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no

claim or right to compensation shall accrue from any such damage.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. **Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. **Relationship of this Permit to Other Department Orders and Determinations** Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. **Applications For Permit Renewals, Modifications or Transfers** The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC Region 2 Headquarters
47-40 21st St
Long Island City, NY11101 -5401

4. **Submission of Renewal Application** The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Tidal Wetlands.

5. **Permit Modifications, Suspensions and Revocations by the Department** The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. **Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

NOTICE OF INTENT TO COMMENCE WORK

Date: _____

NYSDEC Natural Resources
Attn. Habitat Supervisor
N.Y.S.D.E.C Region 2 Office
47-40 21st Street
Long Island City, N.Y. 11101

Re: **NYSDEC Permit No. 2-6201-00416/00001**
Sherman Creek Commercial Development
3875 9th Ave
Manhattan, NY

Dear NYSDEC Habitat Supervisor:

In accordance with Natural Resource Condition 3 of the referenced permit, I hereby serve notice to commence work on _____, 20____.

This is also to certify that, having read this entire permit, I am fully aware of and understand the general and natural resource conditions therein, and agree to comply with all such conditions further understand that prior to undertaking any modification to the subject work, I must seek and receive written approval of the NYSDEC Regional Permit Administrator.

_____
Signature of Permittee

_____
Name of Permittee (please print)

_____
Signature of Contractor

_____
Name of Contractor (please print)

_____
Street Address of Contractor

_____
City, State, & Zip Code of Contractor

_____
Telephone Number of Contractor

WARNING

The permittee and his contractor (if any) are required to follow all permit conditions. Violations of the permit may lead to legal action, including the imposition of substantial monetary fines and corrective work.

cc: **Environmental Permits**
Marine Resources

NOTICE OF COMPLETION OF WORK

Date: _____

NYSDEC Natural Resources
Attn. Natural Resources Supervisor
N.Y.S.D.E.C Region 2 Office
47-40 21st Street
Long Island City, N.Y. 11101

Re: NYSDEC Permit No. 2-6201-00416/00001
Sherman Creek Commercial Development
3875 9th Ave
Manhattan, NY

Dear NYSDEC Natural Resources Supervisor:

In accordance with Natural Resource Condition 5 of the referenced permit, I hereby serve notice that the work allowed by the above referenced permit has been completed as of _____, 20____, consistent with the requirements of the above referenced permit.

_____
Signature of Permittee

_____
Name of Permittee (please print)

_____
Signature of Contractor

_____
Name of Contractor (please print)

_____
Street Address of Contractor

_____
City, State, & Zip Code of Contractor

_____
Telephone Number of Contractor

cc: Environmental Permits
Marine Resources

95-20-1 (8/87)—9d

New York State
Department of Environmental Conservation

NOTICE

The Department of Environmental Conservation (DEC) has issued permit(s) pursuant to the Environmental Conservation Law for work being conducted at this site. For further information regarding the nature and extent of work approved and any Departmental conditions on it, contact the Regional Permit Administrator listed below. Please refer to the permit number shown when contacting the DEC.

Regional Permit Administrator

Permit Number 2-6201-00416/00001

Expiration Date 12/31/2024

Stephen A. Watts III
47-40 21st Street
LIC, NY 11101
(718) 482-4997

NOTE: This notice is **NOT** a permit

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 2
47-40 21st Street, Long Island City, NY 11101
P: (718) 482-4997 | F: (718) 482-4975
www.dec.ny.gov

May 11, 2023

Eli Weiss
Joy Construction
40 Fulton St
New York, NY 10038

Re: NYSDEC Permit No. 2-6201-00416/00001
Sherman Creek Commercial Development - 3875 9th Ave
Block 2188 Lot 1
Manhattan, NY
ECL Article 25 - Tidal Wetlands
NOTICE OF PERMIT TRANSFER

Dear Eli Weiss:

Enclosed is your approved application for permit transfer, which transfers permit number 2-6201-00416/00001 from J 207 ST LLC to Sherman Creek Owner LLC and Sherman Creek LIHTC Owner LLC. Enclosed is a copy of the permit. Please read it carefully. You are required to comply with all conditions of the permit.

Please note that Natural Resources Condition 3 of the permit requires submittal of the attached "Notice of Intent to Commence Work" at least 5 days prior to the start of the permitted activity, and Natural Resources Condition 5 of the permit requires submittal of the attached “Notice of Completion of Work” no later than 10 days following completion.

Technical questions concerning this matter should be directed to Matthew James, Division of Marine Resources, Matthew.James@dec.ny.gov. Administrative questions should be directed to me, NYSDEC Environmental Permits, Jeanette.Rodriguez@dec.ny.gov.

Sincerely,

Jeanette Rodriguez

Jeanette Rodriguez
Environmental Analyst I

NEW YORK STATE OF OPPORTUNITY. **Department of Environmental Conservation**

Application For Permit Transfer and Application for Transfer of Pending Application

NOTE: Please read ALL instructions before completing this application. Please TYPE or PRINT clearly in ink.

PART 1 - TRANSFEREE (New Owner/Operator/Lessee/Applicant) Completes:

1. List Permit Number(s) And Their Effective And Expiration Dates:
2-6201-00416/00001 Permit Dates 7/9/2019 to 12/31/2024

List Pending Application Number(s):

2. Name Of Transferee:
Sherman Creek Owner LLC (Tax ID No. 84-3056087) &
Sherman Creek LIHTC Owner LLC (Tax ID No.92-0274256)

Telephone Number (Daytime): ( )

Email: eli@joycon1st.com

Transferee is a/an: (check all that apply)
☒ Owner ☐ Operator
☐ Lessee ☐ Applicant

Mailing Address:
Eli Weiss c/o Joy Construction, 40 Fulton Street

Post Office City, State, Zip Code:
New York, New York 10038

If other than an individual, provide
Taxpayer ID Number:
see names of transferee

3. Name Of Facility/Project:
3875 9th Avenue

Location (or Street Address, P.O. City, State, Zip Code, if applicable):
Sherman Creek Development

Town / Village / City:
New York, New York 10034

County:
Manhattan

4. Facility Contact Name:
Eli Weiss

Telephone Number (Daytime):
( )

Email: eli@joycon1st.com

Mailing Address:
c/o Joy Construction
40 Fulton Street

Post Office City, State, Zip Code:
New York, New York 10038

5. Has Work Begun On The Project?
Yes ☒ No ☐ If "No," proposed starting date: _____ Approximate completion date: October 2026

If there will be any modifications to the current or proposed operation or construction, the transferee must attach a statement specifying the details.

6. CERTIFICATION: This certifies that the Transferee seeks to be the legally responsible party for operations or project development either authorized by the permits identified above or proposed in applications identified above. The Transferee has a copy of the permit(s) and/or application(s) and understands and will comply with all conditions in the referenced permit(s) and supports the content of referenced application(s). Facility operations/project scope/discharges/emissions will remain the same as authorized or as proposed in pending applications. Further, I hereby affirm that under penalty of perjury that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Printed Name and Title of Transferee Eli Weiss

Signature of Transferee _____ Date 4/17/23

PART 2 - TRANSFEROR (Present or Former Owner/Operator/Lessee/Applicant) Completes:

1. Name Of Transferor:
J 207 ST LLC

Telephone Number (Daytime):
(516)821-2004

If other than an individual, provide
Taxpayer ID Number:
106-62-6534

Mailing Address:
15 Verbena Ave, 2nd Fl

Email:
ana@madddequities.com

Post Office City, State, Zip Code:
Floral Park, New York, New York

2. Name Of Facility/Project, if different from Facility Name in Part 1:

3. CERTIFICATION: This certifies that ownership, operation, or a lease for the facility identified in Part 1 of this form ☐ will be ☒ was conveyed to the party identified as the Transferee on 1/27/2023 (date). I affirm that this conveyance includes the rights and obligations of the permits, approvals, or applications identified above.

Printed Name and Title of Transferor Eli Weiss - Managing Member

Signature of Transferor _____ Date 5/4/2023

PART 3 - PERMIT TRANSFER VALIDATION SECTION - Department Of Environmental Conservation Completes:

FOR DEC USE ONLY

☒ Transfer of permit approved, effective as of 05/11/2023. Transferee subject to conditions of original permit, without exception.
☐ Transfer of permit approved, with the following modifications or contingencies related to this Permit Transfer:

☒ See attached revised permit page(s): Updated permit attached
☐ Transfer of application approved. See attached for additional information required.
☐ Transfer denied, new application required. Please complete the enclosed permit application and return it to the undersigned Regional Permit Administrator at the address listed on the reverse side of this form.

Stephen A Watts III — 05/11/2023

NYSDEC PERMIT ADMINISTRATOR — SIGNATURE — DATE

copies to:

FOR DEC USE ONLY

(rev. 8/16)

PERMIT
Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
Sherman Creek LIHTC Owner LLC
C/O Eli Weiss, Joy Construction
40 Fulton St
New York, NY 10038

Sherman Creek Owner LLC
C/O Eli Weiss, Joy Construction
40 Fulton St
New York, NY 10038

Facility:
Sherman Creek Commercial Development
3875 9th Ave
New York, NY 10034

Facility Location: in NEW YORK COUNTY **Village:** Manhattan
Facility Principal Reference Point: NYTM-E: 591.27216152829 NYTM-N: 4524.18972773537
Latitude: 40°51'49.3" Longitude: 73°55'01.1"
Project Location: 3875 9th Ave. (Block 2188 Lot 1)
Authorized Activity: Development of a 1.9-acre site into a multi-use building facility, including a waterfront public access area which extends approximately 50 feet landward from apparent high water line. The project is partially located within regulated NYSDEC tidal wetlands adjacent area on the Harlem River.

Mod 1: Perform soil cleanup remediation through soil excavation, backfilling, and tree removals

Mod 2: Permit transfer from J 207 ST LLC to Sherman Creek Owner LLC and Sherman Creek LIHTC Owner LLC

Permit Authorizations

Tidal Wetlands - Under Article 25
Permit ID 2-6201-00416/00001

New Permit	Effective Date: 7/9/2019	Expiration Date: 12/31/2024
Modification # 1	Effective Date: 2/24/2022	Expiration Date: 12/31/2024
Modification # 2	Effective Date: 5/11/2023	Expiration Date: 12/31/2024

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: STEPHEN A WATTS, Regional Permit Administrator
Address: NYSDEC Region 2 Headquarters
47-40 21st St
Long Island City, NY 11101 -5401

Authorized Signature: _____ Date _05_/_11_/_2023_

Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: TIDAL WETLANDS

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by as cited in Natural Resources Condition 2.

2. **Conformance with Plans - Addenda** In addition to plans referenced in the Condition titled "Conformance with Plans," the activities authorized by this permit must be in strict conformance with the following approved plans and/or submissions made as part of the permit application:

a. Project plans titled “Proposed Development for W.207th Street and 9th Avenue 3875 9th Ave. New York, NY 10304,” Sheets 1-4 of 4, prepared by Aufgang Architects LLC, issue dated November 1, 2015, last revised May 22, 2019, and received by NYSDEC May 28, 2019.
b. Project plans titled “Proposed New Development for West 207th Street and Exterior Street Waterfront,” Drawing Nos. 5 - 21, prepared by Aufgang Architects LLC, issue dated May 14, 2019, and received by NYSDEC May 28, 2019.
c. Project plans titled “Proposed New Development for West 207th Street and Exterior Street Waterfront Proposed NYS DEC Permit Modification Areas,” Drawing Nos. 1 - 9, prepared by Aufgang Architects LLC, dated February 4, 2022, and received by NYSDEC February 17, 2022.
d. Modification package prepared by Roux Environmental Engineering and Geology, D.P.C., dated February 17, 2022, and prepared by NYSDEC February 17, 2022.

3. **Notice of Intent to Commence Work** At least five (5) days prior to the start of work. Permittee must complete and submit the attached "Notice of Intent to Commence Work" form to the NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101.

4. **Post Permit Sign** The permit sign enclosed with this permit shall be posted in a conspicuous location on the worksite and adequately protected from the weather.

5. **Notice of Completion of Work** Within ten (10) days of the completion of work, Permittee must complete and submit the attached Notice of Completion of Work form to NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101.

6. **Post Construction Photographs** Within 10 days of the completion of work authorized by this permit, Permittee must submit post-construction photographs of the work area to: NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101.

7. **Notice Covenant** No later than thirty (30) days after issuance of this permit, Permittee must incorporate the following language as a notice covenant in the property records for Block 2188 Lot 1, County of New York, replacing the brackets and the text therein as required.

Within forty-five (45) days after the issuance of this permit, a copy of the covenanted deed along with the number assigned to this permit must be sent to: NYSDEC Division of Marine Resources, 47-40 21st Street, Long Island City, New York 11101 (Attention: Matthew James).

The following is the template for the notice covenant:

THIS DECLARATION is made by [insert name], whose address is [insert mailing address], to be entered in the record for certain real property located in the Borough of [insert borough], City and State of New York, [insert county] County Tax Block [insert block] Lot [insert block].

This parcel contains a tidal wetland and/or a tidal wetland adjacent area regulated by New York State laws and regulations. The New York State Department of Environmental Conservation ("NYSDEC") has jurisdiction over both tidal wetlands and tidal wetland adjacent areas, which generally measure 150 feet landward of the most landward boundary of a mapped tidal wetland. The official tidal wetlands maps can be viewed at NYSDEC Region 2 offices.

The development of this parcel has been authorized under NYSDEC permit # 2-6201-00416/00001, which determines the extent of construction, including the extent of impervious surface area(s), for the parcel.

Article 25 of the New York State Environmental Conservation Law (the Tidal Wetlands Act) provides that anyone conducting a regulated activity within a tidal wetland or a tidal wetland adjacent area must first obtain a permit from NYSDEC. Conducting a regulated activity without a permit constitutes a violation of the Tidal Wetlands Act. Any violation of the Tidal Wetlands Act can result in a significant penalty (at the time of this indenture up to $10,000 per day for each violation), as well as criminal sanctions and injunctive relief.

Regulated activities include, but are not limited to:

- any form of draining, dredging, excavation, or removal (directly or indirectly) of soil, mud, sand, shells, gravel, or other aggregate of any kind from any tidal wetland;
- any form of dumping, filling, or depositing (directly or indirectly) of any soil, stones, sand, gravel, mud, rubbish, or fill of any kind;
- the erection of any structures or roads, the driving of any pilings, or the placing of any other obstructions, whether or not changing the ebb and flow of the tide;
- any other activity within or immediately adjacent to inventoried wetlands, which may substantially impair or alter the natural condition of the tidal wetland area; and
- any subdivision of land.

Anyone wishing to conduct any activity within a tidal wetland or a tidal wetland adjacent area should contact the NYSDEC Region 2 Marine Resources Program, prior to the commencement of such activity, to clarify whether an Article 25 permit is required.

Signed, _____
(insert name of landowner)

State of New York)
): ss.:
County of Queens)

On this _____ day of _____ 20__, before me personally came (insert name[s] of landowner[s]), personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument, who being duly sworn deposed and stated that (s)he resides at
_____, and that (s)he is the person described in and who executed the foregoing instrument.

_____
Notary Public

8. Best Management Practices Best management practices will be employed to prevent the loss of construction materials, debris and sediments from entering the wetlands or waterways. Such practices may include, but are not limited to construction fencing, staked hay bales, silt fencing, floating platforms, netting, and containment booms.

9. Dewatering If sediments are to be dewatered into waterways, best management practices, including but not limited to settling basins and filtration bags, must be used to prevent sediments from being released into wetlands and/or navigable waters. If at any time during dewatering a visible sediment plume is apparent, all dewatering must cease and sediment controls must be repaired/replaced before dewatering is allowed to continue.

10. Disturbed Soils All disturbed areas where soil will be temporarily exposed or stockpiled for longer than one (1) week will be contained be a continuous line of staked hay bales/silt curtain (or other NYSDEC approved method) placed on the seaward side between the fill and wetland or protected buffer area. Tarps are authorized to supplement these approved methods.

11. Erosion/Sediment Control All areas of soil disturbance resulting from this project will be stabilized immediately following project completion or prior to permit expiration, whichever comes first. The approved methodologies are as follows:

a. Stabilization of the entire disturbed area with appropriate vegetation (grasses, etc.).
b. Stabilized as per specifications identified on approved plans.
c. Temporarily stabilized with straw or hay mulch or jute matting or other similar natural fiber matting within 1 week of final grading. Temporary stabilization will be maintained until a mature vegetative cover is established.

12. Demolition and Construction Debris Should any demolition or construction debris fall into the waterway or enter the tidal wetlands, it must be removed immediately.

13. Disposal of Demolition and Construction Debris All demolition and construction debris must be properly disposed of at a licensed facility.

14. Concrete or Leachate Must Not Escape During construction, concrete or leachate will not escape or be discharged, nor will washings from transit mix trucks, mixers, or other devices enter any water body, including wetlands or protected buffer areas.

15. Fill Material All fill will consist of "clean" sand, gravel, or soil. The use of material such as asphalt, slag, fly-ash, recycled concrete aggregate (RCA), broken concrete, or demolition debris is strictly prohibited.

16. Storage of Equipment and Materials The storage of construction equipment and materials must be confined to within the project work site and or upland areas greater than 30 linear feet from the tidal wetland boundary.

17. Minimize Adverse Impacts to Wetlands, Wildlife, Water All work must be performed in a manner which minimizes adverse impacts to wetlands, wildlife, water quality, and natural resources.

18. No Interference With Navigation There shall be no unreasonable interference with navigation by the work herein authorized.

19. Precautions Against Contamination of Waters All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

20. Prior Approval of Changes If the Permittee desires to make any changes in construction techniques, species to be planted, the site plan, any mitigation plan, scheduling or staging of construction, or any other aspect of this project, the Permittee shall submit a written request to the Regional Permit Administrator to make such proposed changes and shall not make such changes unless authorized in writing by the Department.

21. Failure to Meet Permit Conditions Failure of the permittee to meet all the conditions of this permit is a violation of this permit and grounds for an order to immediately cease the permitted activity at the project site.

22. **State May Require Site Restoration** If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may lawfully require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

23. **State May Order Removal or Alteration of Work** If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

24. **State Not Liable for Damage** The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. **Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. **Relationship of this Permit to Other Department Orders and Determinations** Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. **Applications For Permit Renewals, Modifications or Transfers** The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC Region 2 Headquarters
47-40 21st St
Long Island City, NY11101 -5401

4. **Submission of Renewal Application** The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Tidal Wetlands.

5. **Permit Modifications, Suspensions and Revocations by the Department** The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. **Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does

not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

NOTICE OF INTENT TO COMMENCE WORK

Date: _____

NYSDEC Natural Resources
Attn. Natural Resources Supervisor
N.Y.S.D.E.C Region 2 Office
47-40 21st Street
Long Island City, N.Y. 11101

Re: NYSDEC Permit No. 2-6201-00416/00001
Sherman Creek Commercial Development - 3875 9th Ave
Permit Transfer
Manhattan, NY

Dear NYSDEC Natural Resources Supervisor:

In accordance with Natural Resource Condition 3 of the referenced permit, I hereby serve notice to commence work on _____, 20____.

This is also to certify that, having read this entire permit, I am fully aware of and understand the general and natural resource conditions therein, and agree to comply with all such conditions further understand that prior to undertaking any modification to the subject work, I must seek and receive written approval of the NYSDEC Regional Permit Administrator.

_____
Signature of Permittee

_____
Name of Permittee (please print)

_____
Signature of Contractor

_____
Name of Contractor (please print)

_____
Street Address of Contractor

_____
City, State, & Zip Code of Contractor

_____
Telephone Number of Contractor

WARNING

The permittee and his contractor (if any) are required to follow all permit conditions. Violations of the permit may lead to legal action, including the imposition of substantial monetary fines and corrective work.

cc: Environmental Permits
Marine Resources

NOTICE OF COMPLETION OF WORK

Date: _____

NYSDEC Natural Resources
Attn. Natural Resources Supervisor
N.Y.S.D.E.C Region 2 Office
47-40 21st Street
Long Island City, N.Y. 11101

Re: NYSDEC Permit No. 2-6201-00416/00001
Sherman Creek Commercial Development - 3875 9th Ave
Permit Transfer
Manhattan, NY

Dear NYSDEC Natural Resources Supervisor:

In accordance with Natural Resource Condition 5 of the referenced permit, I hereby serve notice that the work allowed by the above referenced permit has been completed as of _____, 20____, consistent with the requirements of the above referenced permit.

_____
Signature of Permittee

_____
Name of Permittee (please print)

_____
Signature of Contractor

_____
Name of Contractor (please print)

_____
Street Address of Contractor

_____
City, State, & Zip Code of Contractor

_____
Telephone Number of Contractor

cc: Environmental Permits
Marine Resources

95-20-1 (8/87)—9d

New York State
Department of Environmental Conservation

NOTICE

The Department of Environmental Conservation (DEC) has issued permit(s) pursuant to the Environmental Conservation Law for work being conducted at this site. For further information regarding the nature and extent of work approved and any Departmental conditions on it, contact the Regional Permit Administrator listed below. Please refer to the permit number shown when contacting the DEC.

Regional Permit Administrator

Permit Number 2-6201-00416/00001

Expiration Date 12/31/2024

NOTE: This notice is **NOT** a permit

Stephen A Watts III
47-40 21st Street
LIC, NY 11101
(718) 482-4997