FORMER FO PIERCE COMPANY

QUEENS COUNTY

LONG ISLAND CITY, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C241251

Prepared for:

50th and 5th LIC LLC

184 North 8th Street

Brooklyn, New York 11211

Prepared by:

Roux Environmental Engineering and Geology, D.P.C.

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

DECEMBER 2023

CERTIFICATION STATEMENT

I, Charles J. McGuckin, P.E. certify that I am currently a NYS registered professional engineer 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).

. Charles J. McGuckin,P.E.	December 27, 2023	
NYS Professional Engineer #069509	Date	Signature

TABLE OF CONTENTS

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Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms

AS	Air Sparging
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
CO2	Carbon Dioxide
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
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Greenhouse Gas
GWE&T	Groundwater Extraction and Treatment
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
OU	Operable Unit
P.E. or PE	Professional Engineer
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRP	Potentially Responsible Party
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
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVOC	Semi Volatile Organic Compound
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
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification:	C241251, FORMER FO PIERCE COMPANY, 2-33 50TH AVE, LONG ISLAND CITY, NEW YORK

Institutional Controls:	1. The property may be used for restricted residential, or commercial use;
	2. All ECs must be operated and maintained as specified in this SMP;
	3. All ECs 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 NYC Department of Health 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 this SMP; 6. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP; 7. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP; 8. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP; 9. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this 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 the Environmental Easement; 11. The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 6, and any potential impacts that are identified must be monitored or mitigated; 12. Vegetable gardens and farming on the site are prohibited; and 13. 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.
Engineering Controls:	1. Cover system
	2. Groundwater monitoring related to in-situ treatment

Inspections:	Frequency
1. Cover inspection	Annually
Monitoring:	
1. Groundwater Monitoring Wells GW-01 through GW-07	Quarterly for 4 rounds; Evaluate thereafter
Reporting:	
1. Groundwater Data	Quarterly for 4 rounds; Evaluate thereafter
2. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Former FO Pierce Company Site located in the Long Island City section of Queens, New York (hereinafter referred to as the "Site"). See Figure 1. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C241251, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

50th & 5th LIC LLC entered into a Brownfield Cleanup Agreement (BCA) on June 4, 2021 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in Figure 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." The area with remaining contamination, Track 4, accounts for approximately 30% of the square footage of the site. The remaining 70% of the site has achieved Conditional Track 1 SCOs. 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 Queens 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 #C241251-05-21); Site #C241251 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 New York State. A list of contacts for persons involved with the site is provided in Appendix B of this SMP.

This SMP was prepared by Roux, on behalf of 50th & 5th LIC LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and errata sheet dated April, 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 New York State Professional Engineer. 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. 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 Brownfield Cleanup Agreement (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 below 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****
NYSDEC Project Manager Sydney Sobol	(518) 402-4799 sydney.sobol@dec.ny.gov	All Notifications
NYSDEC Project Supervisor Douglas MacNeal	(518) 402-9684 douglas.macneal@dec.ny.gov	All Notifications
NYSDEC Site Control Kelly Lewandowski	(518)402-9569 kelly.lewandowski@dec.ny.gov	Notification 1

Name	**Contact Information**	**Required Notification****
NYSDOH Project Manager Harolyn L. Hood	(518) 473-4780 Harolyn.Hood@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 Long Island City, Queens County, New York and is identified as Block 17 and Lot 1 on the Queens Tax Map (see Figure 1). The site is an approximately 1.74 acre area and is bounded by 49th Avenue to the north, 50th Avenue to the south, 5th Street to the east, and residential and commercial properties to the west (see Figure 2 – Site Layout Map). The boundaries of the site are more fully described in Appendix A –Environmental Easement. The owner of the site parcel at the time of issuance of this SMP is:

50th & 5th LIC LLC

The operator of the site parcel at the time of issuance of this SMP is:

50th & 5th LIC LLC

2.2 Physical Setting

2.2.1 Land Use

The Site is currently undergoing redevelopment for a mixed-use (residential and commercial), mixed-income building with a partial cellar. The Site is zoned Residential and Commercial. A Subway Easement for the New York City Transit (NYCT) Subway 7 Line (Route No. 26) runs beneath the Site's southern portion at a depth that decreases as the Tunnel transverses diagonally from west to southeast beneath the Site. The existence of the Subway easement limited the extent of potential remedial excavations in the area, preventing pursuit of Track 1 SCOs for the now Track 4 area of the Site.

Prior to the remedial action, the Site was vacant and consisted of a combined single- and two-story building, a parking lot, and overgrown vegetation in the west portion of the Site. Prior to that, the Site was used as a warehouse for art storage. According to city records, the original building was built in 1931 and altered in 1987. Historically, the Site was developed and used for varnish and paint manufacturing from the late 1800s to the early 1980s.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential properties. The properties immediately south of the Site

include a MTA fan ventilation plant, several residential properties, mixed-use and commercial use properties, and a UA Local 1 (labor union) building; the properties immediately north of the Site include several residential and commercial properties, a school, and a parking facility; the properties immediately east of the Site include several residential, mixed-use, and commercial properties including an auto repair shop; and the properties to the west of the Site include residential and commercial properties.

2.2.2 Geology

The grade at the Site is relatively flat. The elevation of the Site and surrounding area is approximately 6.88 feet above mean sea level (amsl).

Based on the investigations completed on-Site to date, the shallow deposits at the Site are typical of historic fill material found in urban environments such as New York City (i.e., brick and concrete). The depth to the bottom of the fill layer extends to between five and 10 feet (ft) below land surface (bls) across the Site. This urban fill material overlies deeper native deposits consisting predominantly of fine to medium sand and silt with intermittent peat deposits. Bedrock was not encountered during the Roux Remedial Investigation (RI).

A geologic cross section is shown in Figure 3. Site specific boring logs are provided in Appendix C.

2.2.3 Hydrogeology

According to water-level data collected during the RI, the elevation of the water table surface at the Site ranges from approximately 2.4 ft NAVD 88 in the eastern portion of the Site to approximately 0.6 ft NAVD 88 in the western portion of the Site. Groundwater depth at the Site varied from 5.15 ft bls to 9.01 ft bls. A groundwater flow map is provided in Figure 4 and it shows that the flow is generally to the west towards the East River. Groundwater elevation data is provided in Table 2. Groundwater monitoring well construction logs are provided in Appendix C.

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.

Based on review of historical aerial photographs, the Site appears partially developed with multiple structures since at least 1924. The building structures on the eastern side appear consistent with the current Site configuration since 1980 and the general Site layout appears consistent with the current Site configuration since 2006, where the buildings on the western side are no longer depicted and the area is vacant and overgrown by vegetation as observed during the Site reconnaissance. The Site configuration corroborates the development as shown in the Certified Sanborn Fire Insurance maps. According to a 2002 Phase I Environmental Site Assessment (ESA) prepared by EBI Consultants, the seven (7) building structures on the eastern side were gut renovated and combined in 1984 for use as a warehouse.

According to the City Directory Abstract obtained from EDR, noted operators/tenants of the Site include: F.O. Pierce Co. paint and varnish, Hillman H. R. and Dessiedess Paint Co. between 1950 and 1983 under the address 2-33 5th Ave. Under the address 49-20 5th St, between 1945 and 2005, the operators/tenants include: Lexington Paint & Varnish Works, Eagle Paint & Varnish Corp., Judson Art Warehouse, Fortress Fae Worldwide/Fortress New York Holdings.

The following environmental reports were available for review:

- Phase II Investigation Results, prepared by Roux Environmental Engineering and Geology D.P.C, dated August 17, 2020.
- Remedial Investigation Report, prepared by Roux Environmental Engineering and Geology D.P.C, dated January 18, 2022.
- Remedial Action Work Plan (RAWP), prepared by Roux Environmental Engineering and Geology D.P.C., dated March 2022.

The following section summarizes soil, groundwater, and soil vapor quality data that was generated by Roux during the RI (and Phase II ESA):

- Soil: The Site is covered with 5 to 10 ft of urban fill. Soil samples indicate that the upper 3-4 ft of the fill contains SVOCs (primarily PAHs) and elevated metals (primarily lead and mercury) in exceedance of the SCOs (UUSCO, RRSCO, and/or PGWSCO). In some locations (north of NYC MTA Lot 19 and inside the warehouse), SCO exceedances also occur at lower depths to approximately 9 ft. Soil samples collected at deeper intervals (13-15 ft and 15-17 ft) had no exceedances of any compounds. The exceedances found in soil are attributed to typical urban fill across the Site. PFOA and PFOS concentrations were either non-detect or detected below the current NYSDEC guidance values.

- Groundwater: Depth to groundwater at the Site varied from 5.15 ft bls to 9.01 ft bls. The direction of groundwater flow is to the west towards the East River. Groundwater samples detected SVOCs (primarily PAHs) exceeding the AWQSGVs in the majority of the samples, however these concentrations most likely reflect adsorbed SVOCs on turbid samples and don't reflect dissolved concentrations. Limited VOCs were detected in some locations (near the former tank vault excavation area and the former oil storage building) at low to moderate levels. The metals exceedances in groundwater include iron, magnesium, manganese and sodium and are not a concern. PFOA and PFOS were detected at marginal concentrations in all samples.
- Soil Vapor: Soil vapor samples detected a wide range of hydrocarbon compounds in almost every sample. Most of these soil vapor detections were low and were not found in groundwater or soil, with exception of two hydrocarbon VOCs (xylenes and benzene), which were found in groundwater at low concentrations in only two wells (MW-16 and GW-5). MW-16 is located near the former oil storage building at the center of the Site and GW-5 is located on the east side of the Site inside the current warehouse. These VOCs, however, were not found in soil. The chlorinated VOCs TCE and PCE were detected in most samples at low to moderate concentrations across the Site. These compounds were not detected onsite in soil or groundwater. The soil vapor detections are believed to originate from off-Site sources.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated April, 5, 2022 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.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated 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, soil vapor intrusion into buildings at a site.

2.5 Remaining Contamination

2.5.1 Soil

The remaining soil contamination after the remedial action was completed is located in the south portion of the Site where a Track 4 Restricted Residential Use cleanup was achieved through the implementation of EC (Site Cover System) where UUSCOs were exceeded. All of the remaining soil has been contained under the Site cover system as described in Section 3.3.1. The Site cover system is a two-foot thick cover including a concrete slab on grade, waterproofing/vapor barrier demarcation layer, and NYSDEC approved clean subbase that is detailed on Figure 5. Based on the endpoint samples collected during the remedial action, the remaining contamination is limited primarily to a subset of certain VOCs, SVOCs, metals, and PCBs. No exposed soil remains onsite as the Site Cover System (slab on grade) covers the entirety of the Track 4 area and the building foundation slab covers the entirety of the Conditional Track 1 area. Table 3 and Figure 6 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 remedial action.

A Subway Easement for the New York City Transit (NYCT) Subway 7 Line (Route No. 26) runs beneath the Site's southern portion at a depth that decreases as the Tunnel transverses diagonally from west to southeast beneath the Site. The subway easement prevented the pursuit of Track 1 SCOs in the southern area of the site due to the excavation restrictions tied to the easement.

2.5.2 Groundwater

The remaining groundwater contamination after the remedial action was completed is limited to one VOC, Benzene, in a localized area in the north portion of the Conditional Track 1 area. The groundwater contamination is a result of a hotspot area (SW-19) detected in soil located in WC-5/WC-8. During the remedial action, the hotspot soil was delineated, excavated to the remedial depth of 22 ft bls, and removed from the Site. Following removal, in situ chemical treatment occurred within the hotspot excavation limits utilizing Regenesis products. RegenOX was applied directly to soil exposed from the excavation to oxidize contaminants and Oxygen Release Compound Advanced (ORC-A) was applied to the stone backfilled into the excavation to facilitate long-term aerobic bioremediation of residual contaminants. Table 3 and Figure 6 summarize the results of the sample of groundwater that exceeded the SCGs after completion of the remedial action. The groundwater sample (GW022223) was collected from a temporary well that was installed downgradient of the SW-19 hotspot area in WC-1. The temporary well was constructed of two inch PVC with a 10 foot screen that extended from 16 to 26 ft bls. The well has since been destroyed.

2.5.3 Soil Vapor

No soil vapor sampling was required to be completed as part of the remedial action. For information relating to the existing and remaining soil vapor conditions, please refer to section 2.3 of this SMP.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (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 Excavation Work Plan (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; and
- 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 RAWP and/or 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 or 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 Figure 7. These ICs are:

- The property may be used for: restricted residential or 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 NYC Department of Health 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;
- Groundwater and other environmental or public health monitoring 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 Figure 7, and any potential impacts that are identified must be monitored or mitigated;
- Vegetable gardens and farming on the site are prohibited; and
- 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 (or Cap)

Exposure to remaining contamination at the site is prevented by a cover system installed over the entirety of the site, leaving no areas of exposed soils. This cover system is comprised of a minimum of 10 inches of concrete underlain by a vapor barrier membrane and 14 inches of NYSDEC-approved clean stone/backfill, with the exception of a few locations (localized areas in Grids WC-2, -3, -4, -7, -10, and -11) that are comprised of a minimum of 10 inches of concrete underlain by a vapor barrier membrane and 14 inches of additional concrete. Figure 5 presents the location of the cover system and applicable demarcation layers. The Excavation Work Plan (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 Health and Safety Plan (HASP) 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 Professional Engineer (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.

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 remedial action objectives 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).

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all site-related monitoring, injection and recovery wells as per the NYSDEC CP-43 policy.

The remedial party will conduct any needed site restoration activities, such as asphalt/concrete patching, 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 (or Cap)

The composite cover system is a permanent control installed over the entirety of the Track 4 area and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity. No remaining soils have been left exposed at the site.

3.3.2.2 - Monitoring Wells associated with In-Situ Technology

Groundwater monitoring activities to assess the effectiveness of the RegenOX and Oxygen Release Compound Advanced (ORC-A) treatment described in section 2.5.2 will continue, as

determined by the NYSDEC project manager in consultation with NYSDOH project manager, and as described in the approved ground water monitoring plan dated June 20, 2023, until residual groundwater concentrations are found to be consistently below ambient water quality standards or the site SCGs, or have become asymptotic at an acceptable level over an extended period. If monitoring data indicates that monitoring may no longer be required, a proposal to discontinue the remedy will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC project manager. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional injections, source removal, treatment and/or control measures will be evaluated.

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., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- 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;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- 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 environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (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. 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; and
- 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. 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; and
- 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 Treatment System Monitoring and Sampling

There are no Active EC's; therefore, Treatment System Monitoring and Sampling is not included in this SMP.

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the groundwater monitoring wells on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 4 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Table 4– Post Remediation Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters**					**Schedule**
	VOCs (EPA Method 8260D)	SVOCs (EPA method 8270D)	Dissolved SVOCs (EPA	Total Metals (EPA Method 6020/Hg)	Dissolved Metals (EPA Method 6020/Hg)	
Monitoring Wells (GW-01 to GW-07)	X	X	X	X	X	Quarterly for four rounds

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

There is no other media to be monitored and sampled after the remediation is completed; therefore, it is not included in this SMP. The remedial elements including excavation and the Site Cover System addressed remaining soil contamination in the Track 4 portion of the Site. An EWP is included as Appendix D in the event that future excavation and/or import or reuse of soil is required.

4.4.1 Groundwater Sampling

Groundwater monitoring will be performed as part of the SMP. Sampling will occur quarterly for a total of four sampling events to assess the performance of the remedy. Following the fourth sampling event, a Groundwater Monitoring Plan Summary Report will be prepared and submitted to the NYSDEC outlining the sampling results and proposed course of action. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

A network of monitoring wells has been installed to monitor upgradient, on-site and downgradient groundwater conditions at the site. The network of on-site and off-site wells has been designed to monitor the overall performance of the remedial action. As of September 9th, 2023, all seven ground water monitoring wells have been installed in accordance with the approved Groundwater Monitoring Plan.

The monitoring well network includes seven ground water monitoring wells that monitor downgradient plume migration. These wells are uncontaminated and located directly downgradient of the plume and upgradient of sensitive receptors. The monitoring well network for this site includes the following ground water wells:

- GW-01;
- GW-02;
- GW-03;
- GW-04;
- GW-05;
- GW-06; and
- GW-07.

The monitoring wells were selected to monitor remaining contamination onsite and potential migration offsite. GW-01 through GW-04 monitor upgradient and downgradient of the Conditional Track 1 area and GW-05 through GW-07 are positioned to monitor upgradient and downgradient of the Track 4 area.

Table 5 summarizes the wells' identification numbers, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, two upgradient wells, two on-site wells and three downgradient wells are sampled to evaluate the effectiveness of the remedial activities. The remedial party will measure depth to the water table for each monitoring well in the network before sampling.

Table 5 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
				Casing	Surface	Screen Top	Screen Bottom
GW-01	Onsite/ Downgradient	40.743991 -73.957744	2	6.83	7.08	1.08	-8.92
GW-02	Onsite/ Downgradient	40.743898 -73.957779	2	6.83	7.08	1.08	-8.92
GW-03	Downgradient	40.744005 -73.957417	2	7.25	7.5	1.5	-8.5
GW-04	Upgradient	40.743593 -73.956382	2	9.23	9.48	3.48	-6.52
GW-05	Upgradient	40.743317 -73.956462	2	9.29	9.54	3.54	-6.46
GW-06	Downgradient	40.743346 -73.956982	2	8.83	9.08	3.08	-6.92
GW-07	Downgradient	40.743522 -73.957936	2	6.91	7.16	1.16	-8.84

Monitoring wells are constructed of 2" PVC with 10 feet of screen, 20 slot, set 8 ft below the water table and 2 feet above the water table at each location. Groundwater level is anticipated to be encountered at +1.21' elevation once recharge is complete. The annular space surrounding the well screen is filled with sand with a 2-foot grout seal and a flush mount steel monitoring well

cover installed at grade. The well locations to be installed in August, GW-01 and GW-02, will be installed within a small street level access corridor that runs north to south along the western perimeter of the site (indoor). Wells GW-03 through GW-7 are located outdoors within the sidewalk surrounding the property.

Monitoring well construction logs are included in Appendix C of this document. A groundwater contour map is included as Figure 4 of this document. The groundwater monitoring well locations is included as Figure 2 of Appendix F (Quality Assurance Project Plan/ Field Sampling Plan) of this document.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC project manager will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC project manager. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC project manager.

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 groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.2 Soil Vapor Intrusion Sampling

The potential for soil vapor intrusion will be evaluated on all future buildings developed on the Track 4 area of the site with a provision for monitoring or mitigation.

4.4.3 Monitoring and 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., groundwater monitoring well 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 F of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems 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.

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.

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.

- Flood Plain: The Site is located in Flood Zone AE (el. 10). AE designation indicates that the site is located in a flood zone with a 1% annual chance of flooding.
- Site Drainage and Storm Water Management: During construction, adequate storm management systems were constructed for the building and Site; therefore, flooding is not anticipated.
- Erosion: The Site is capped by a building and Slab on Grade, therefore, erosion at the Site is not anticipated.
- High Wind: The Site is not susceptible to damage from the wind itself or from falling objects, such as trees or utility structures during periods of high wind.
- Electricity: Power loss, dips and/or surges in voltage during severe weather events, including lightning strikes, and the associated impact on Site equipment and operations are not anticipated.
- Spill/Contaminant Release: No areas of the Site have been identified that may be susceptible to a spill or other containment release due to storm-related damage caused by flooding, erosion, high winds, loss of power, etc.
- Wildfires: The immediate area surrounding the Site is not wooded and therefore there is low wildfire risk.

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).

Green remediation principles and techniques were implemented to the extent feasible in the design, implementation, and Site management of the remedy per DER-31. The primary green remediation principles incorporated into the Site's remediation are as follows:

a. Consideration of the environmental impacts of treatment technologies and remedy stewardship over the long term;
b. Reduction of direct and indirect greenhouse gases and other emissions;
c. Increase in energy efficiency and minimizing use of non-renewable energy;
d. Conservation and efficient management of resources and materials;
e. Reduction of waste and increase in recycling and reuse of materials which would otherwise be considered a waste;
f. Maximization of habitat value and creation of habitat when possible;
g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
h. Integration of the remedy with the end use where possible and encouragement of green and sustainable re-development.

In addition, to further incorporate green remediation principles and techniques to the extent feasible in the development at this Site, on-Site buildings included, at a minimum, a 20-mil vapor barrier on the foundation to improve energy efficiency.

6.2.1 Timing of Green Remediation Evaluations

As there is no major remedial system onsite, this section is not applicable. 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.

6.2.2 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 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.

Consideration was given to sampling frequencies, coordination/consolidation of field activities, vehicle use and design materials to improve sustainability and minimize the environmental impact of enacting the remedy.

Site cover system was designed entirely with concrete allowing for minimal maintenance to maintain its effectiveness.

6.3 Remedial System Optimization

Although no Remedial system exists at the site, a Remedial System Optimization (RSO) study will be conducted any time that the NYSDEC project manager or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide

recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

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. 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 Professional Engineer (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.

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 6 and summarized in the Periodic Review Report.

Table 6 — Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Annually or as otherwise determined by the Department
Periodic Review Report	First report 30 days after the end of each certification period. First report will be submitted after the first 16-month certification period, then annually until completion and documentation of all development-related construction, then every 3 years thereafter or as otherwise determined by the NYSDEC.
SVI Evaluation	Upon change of use/occupancy of a previously unoccupied building or initial occupancy of a new building. Following any changes or major repairs to the Site Cover system

* 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., well 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; and
- 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); and
- 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 EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the NYSDEC project manager beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually 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 Periodic Review 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 Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site 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 (groundwater), 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; and
  - A groundwater elevation contour map for each gauging event.

- 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) or Decision Document;
  - 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 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, or Decision Document; and
  - 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 Professional Engineer licensed to practice and registered in New York State will prepare, and include in the Periodic Review Report, 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 site management plan 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.*
- *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 [business address], am certifying as Owner's Designated Site Representative. "

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

- *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."*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The Periodic Review Report 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

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

Addendum In Situ Soil Characterization Results – Lead Delineation Letter Report, prepared by Roux Environmental Engineering and Geology, D.P.C., dated May 23, 2022.

In Situ Soil Characterization Results Letter Report, prepared by Roux Environmental Engineering and Geology, D.P.C., dated March 16, 2022.

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).

NYS Department of Environmental Conservation Decision Document (DD), prepared by the Division of Environmental Remediation, Dated April 2022

Phase I Environmental Site Assessment (ESA), prepared by Roux Environmental Engineering and Geology, D.P.C., dated April 15, 2019.

Phase II Investigation results, prepared by Roux Environmental Engineering and Geology, D.P.C., dated August 17, 2020.

Remedial Investigation Report (RIR), prepared by Roux Environmental Engineering and Geology, D.P.C., dated January 18 2022.

Revised Remedial Action Work Plan (RAWP), prepared by Roux Environmental Engineering and Geology, D.P.C., dated March 2022.

Groundwater monitoring plan (GWMP), prepared by Roux Environmental Engineering and Geology, D.P.C., dated 6/20/2023,

NYS Department of Environmental Conservation, Groundwater Monitoring Plan Approval Letter, dated 6/27/2023

TABLES

1. Notifications
2. Groundwater Elevation Measurements
3. Remaining Soil and Groundwater Sample Exceedances
   a. Summary of Volatile Organic Compounds in Soil
   b. Summary of Semivolatile Organic Compounds in Soil
   c. Summary of Metals in Soil
   d. Summary of Polychlorinated Biphenyls in Soil
   e. Summary of Pesticides and Herbicides in Soil
   f. Summary of Per- and Polyfluoroalkyl Substances in Soil
   g. Summary of TCLP Metals in Soil
   h. Summary of Volatile Organic Compounds in Groundwater
   i. Summary of Semivolatile Organic Compounds in Groundwater
4. Post Remediation Media Monitoring
5. Monitoring Well Construction Details
6. Schedule of Interim Monitoring/Inspection Reports
7. Tracks 1 and 4 Soil Cleanup Objectives

Table 1. Notifications, 2-33 50th Avenue, Long Island City, New York

Name	Contact Information	Required Notification**
NYSDEC Project Manager Sydney Sobol	(518) 402-4799 sydney.sobol@dec.ny.gov	All Notifications
NYSDEC Project Supervisor Douglas MacNeal	(518) 402-9684 douglas.macneal@dec.ny.gov	All Notifications
NYSDEC Site Control Kelly Lewandowski	(518)402-9569 kelly.lewandowski@dec.ny.gov	Notification 1
NYSDOH Project Manager Harolyn L. Hood	(518) 473-4780 Harolyn.Hood@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.

Table 2. Groundwater Gauging Data, 2-33 50th Avenue, Long Island City, New York

Monitoring Well	Date	Measuring Point Elevation** (ft NAVD88)	Depth To Water (ft bls)	Groundwater Elevation (ft NAVD88)	Comments
*MW-12	8/6/2021	8.65	7.47	1.18	
*MW-13	8/6/2021	8.75	7.45	1.30	
*MW-14	8/6/2021	8.04	9.01	-0.97	
*MW-15	8/6/2021	9.97	8.68	1.29	
*MW-16	8/6/2021	10.00	8.78	1.22	
*MW-18	8/6/2021	8.26	6.62	1.64	
*MW-20	8/6/2021	7.71	5.15	2.56	
*MW-21	8/6/2021	9.51	8.05	1.46	
*MW-25	8/6/2021	8.82	7.60	1.22	
*MW-26	8/6/2021	10.00	8.81	1.19	
GW-01	9/6/2023	7.08	6.00	1.08	
GW-02	9/7/2023	7.08	8.00	-0.92	
GW-03	7/20/2023	7.50	9.00	-1.50	
GW-04	7/21/2023	9.48	8.00	1.48	
GW-05	7/21/2023	9.54	7.00	2.54	
GW-06	7/19/2023	9.08	9.00	0.08	
GW-07	7/21/2023	7.16	10.00	-2.84	

ft - Feet

ft bls - Feet below land surface

ft NAVD88 - Feet relative to North American Vertical Datum of 1988

* - Indicates well was properly decommissioned during remediation

** - Top of monitoring well pipe elevation

Notes Utilized Throughout Tables
Soil Tables
J - Estimated value
J+ - Estimated value, high bias
J- - Estimated value, low bias
P - The RPD between the results for the two columns exceeds the method-specified criteria
RPD - Relative Percent Difference
R - Sample results rejected by validator
U - The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit
UJ - Analyte was not detected. The associated reported quantitation limit is an estimate
ft bls - Feet below land surface
FD - Duplicate sample
NA - Compound was not analyzed for by laboratory
mg/kg - Milligrams per kilogram
ng/g - Nanograms per gram
NYSDEC - New York State Department of Environmental Conservation
SCO - Soil Cleanup Objectives
-- No SCO available
Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use SCO
Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential SCO
Per- and Polyfluoroalkyl Substances (PFAS)
GV - Guidance Values
EMPC - The results do not meet all criteria for a confirmed identification. The quantitative value represents the Estimated Maximum Possible Concentration of the analyte in the sample
Bold data indicates that parameter exceeded the NYSDEC Unrestricted Use Guidance Values
Shaded data indicates that parameter exceeded the NYSDEC Restricted Residential Guidance Values
TCLP Tables
mg/L - Milligrams per liter
USEPA - United States Environmental Protection Agency
TCLP - Toxicity Characteristic Leaching Procedure
USEPA Regulatory Levels - United States Environmental Protection Agency Limits for RCRA Characteristic Waste for Toxicity
RCRA - Resource Conservation and Recovery Act
Bold - Parameter was detected above USEPA Regulatory Levels
Groundwater Tables
J - Estimated Value
U - The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit
R - Sample results rejected by validator
µg/L - Micrograms per liter
NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
-- No NYSDEC AWQSGV available
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
1,1-Dichloropropene	--	--	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.00044 J	0.0024 U	0.042	0.055	2.2
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0012 J	0.0024 U	0.01	0.049	0.13 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0038 U	0.0036 U	0.0037 U	0.0041 U	0.19 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
1,2-Dichloropropane	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.00027 J	0.0024 U	0.0014 J	0.024	0.13 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,3-Dichloropropane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0026 U	0.0024 U	0.011	0.01	0.69
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.1 U	0.097 U	0.099 U	0.11 U	5.1 U
2,2-Dichloropropane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
2-Chlorotoluene	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
2-Hexanone	--	--	MG/KG	0.013 U	0.012 U	0.012 U	0.014 U	0.64 U
4-Chlorotoluene	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
4-Ethyltoluene	--	--	MG/KG	0.0026 U	0.0024 U	0.00069 J	0.018	0.13 U
Acetone	0.05	100	MG/KG	0.033	0.028	0.049	**0.091**	0.64 U
Acrylonitrile	--	--	MG/KG	0.0051 U	0.0048 U	0.005 U	0.0054 U	0.25 U
Benzene	0.06	4.8	MG/KG	0.00064 U	0.00061 U	0.0007	0.0096	0.032 U
Bromobenzene	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
Bromodichloromethane	--	--	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
Bromoform	--	--	MG/KG	0.0051 U	0.0048 U	0.005 U	0.0054 U	0.25 U
Bromomethane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
Carbon Disulfide	--	--	MG/KG	0.011 J	0.0056 J	0.018	0.014 U	0.64 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
Chlorobenzene	1.1	100	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.0013	0.032 U
Chloroethane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
Chloroform	0.37	49	MG/KG	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.096 U
Chloromethane	--	--	MG/KG	0.0051 U	0.0048 U	0.005 U	0.0054 U	0.25 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
Cymene	--	--	MG/KG	0.0013 U	0.0012 U	0.0067	0.032	0.064 U
Dibromochloromethane	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
Dibromomethane	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
Dichlorodifluoromethane	--	--	MG/KG	0.013 U	0.012 U	0.012 U	0.014 U	0.64 U
Dichloroethylenes	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
Ethylbenzene	1	41	MG/KG	0.00018 J	0.0012 U	0.00089 J	0.0054	0.064 U
Hexachlorobutadiene	--	--	MG/KG	0.0051 U	0.0048 U	0.005 U	0.0054 U	0.25 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.001 J	0.00019 J	0.004	0.012	0.73
m,p-Xylene	--	--	MG/KG	0.0033	0.0012 J	0.0031	0.059	0.13 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.0066 J	0.01 J	0.015	0.0096 J	0.64 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.013 U	0.012 U	0.012 U	0.014 U	0.64 U
Methylene Chloride	0.05	100	MG/KG	0.0064 U	0.0061 U	0.0062 U	0.0068 U	0.32 U
Naphthalene	12	100	MG/KG	0.0026 J	0.0048 U	0.018	0.14 J	0.13 J
N-Butylbenzene	12	100	MG/KG	0.0013 U	0.0012 U	0.0081	0.01	1.3
N-Propylbenzene	3.9	100	MG/KG	0.00036 J	0.0012 U	0.0083	0.012	1.6
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0023	0.0012 U	0.0041	0.027	0.064 U
Sec-Butylbenzene	11	100	MG/KG	0.00019 J	0.0012 U	0.0074	0.017	1.8
Styrene	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0041	0.064 U
T-Butylbenzene	5.9	100	MG/KG	0.00047 J	0.00019 J	0.0035	0.0062	0.24

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0026 U	0.0024 U	0.0025 U	0.0027 U	0.13 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
Toluene	0.7	100	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.025	0.064 U
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0019 U	0.0018 U	0.0019 U	0.002 U	0.096 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0064 U	0.0061 U	0.0062 U	0.0068 U	0.32 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00064 U	0.00061 U	0.00062 U	0.00068 U	0.032 U
Trichlorofluoromethane	--	--	MG/KG	0.0051 U	0.0048 U	0.005 U	0.0054 U	0.25 U
Vinyl Acetate	--	--	MG/KG	0.013 U	0.012 U	0.012 U	0.014 U	0.64 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.064 U
Xylenes	0.26	100	MG/KG	0.0056	0.0012 J	0.0072	0.086	0.064 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: EP-6	EP-7	EP-8	EP-9	EP-9
				Sample Date: 11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
				Sample Depth (ft bls): 11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
				Normal Sample or Field Duplicate: N	N	N	N	FD
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
1,1,2-Trichloroethane	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
1,1-Dichloroethane	0.27	26	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
1,1-Dichloroethene	0.33	100	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
1,1-Dichloropropene	--	--	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
1,2,3-Trichlorobenzene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,2,3-Trichloropropane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	11	0.0025 U	0.01	0.00086 J	0.0032 U
1,2,4-Trichlorobenzene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0026	0.001 J
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	4.1 U	0.0038 U	0.0038 U	0.0035 U	0.0048 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
1,2-Dichlorobenzene	1.1	100	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,2-Dichloroethane	0.02	3.1	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
1,2-Dichloropropane	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	2.8 U	0.0025 U	0.00027 J	0.0027	0.0021 J
1,3-Dichlorobenzene	2.4	49	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,3-Dichloropropane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,4-Dichlorobenzene	1.8	13	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
1,4-Diethyl Benzene	--	--	MG/KG	2.2 J	0.0025 U	0.0022 J	0.0023 U	0.0032 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	110 U	0.1 U	0.1 U	0.094 U	0.13 U
2,2-Dichloropropane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
2-Chlorotoluene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
2-Hexanone	--	--	MG/KG	14 U	0.013 U	0.013 U	0.012 U	0.016 U
4-Chlorotoluene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
4-Ethyltoluene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0014 J	0.0032 U
Acetone	0.05	100	MG/KG	14 U	0.013 U	0.0088 J	0.007 J	0.016
Acrylonitrile	--	--	MG/KG	5.5 U	0.005 U	0.0051 U	0.0047 U	0.0064 U
Benzene	0.06	4.8	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
Bromobenzene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: EP-6	EP-7	EP-8	EP-9	EP-9
				Sample Date: 11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
				Sample Depth (ft bls): 11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
				Normal Sample or Field Duplicate: N	N	N	N	FD
Bromochloromethane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
Bromodichloromethane	--	--	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
Bromoform	--	--	MG/KG	5.5 U	0.005 U	0.0051 U	0.0047 U	0.0064 U
Bromomethane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
Carbon Disulfide	--	--	MG/KG	14 U	0.013 U	0.013 U	0.012 U	0.016 U
Carbon Tetrachloride	0.76	2.4	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
Chlorobenzene	1.1	100	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
Chloroethane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
Chloroform	0.37	49	MG/KG	2.1 U	0.0019 U	0.0019 U	0.0018 U	0.0024 U
Chloromethane	--	--	MG/KG	5.5 U	0.005 U	0.0051 U	0.0047 U	0.0064 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
Cymene	--	--	MG/KG	1.4 U	0.00019 J	0.00025 J	0.0043	0.0029
Dibromochloromethane	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
Dibromomethane	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
Dichlorodifluoromethane	--	--	MG/KG	14 U	0.013 U	0.013 U	0.012 U	0.016 U
Dichloroethylenes	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
Ethylbenzene	1	41	MG/KG	1.4 U	0.0013 U	0.0002 J	0.00031 J	0.0016 U
Hexachlorobutadiene	--	--	MG/KG	5.5 U	0.005 U	0.0051 U	0.0047 U	0.0064 U
Isopropylbenzene (Cumene)	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.00027 J	0.0016 U
m,p-Xylene	--	--	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0009 J	0.0032 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	14 U	0.013 U	0.0036 J	0.012 U	0.016 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	14 U	0.013 U	0.013 U	0.012 U	0.016 U
Methylene Chloride	0.05	100	MG/KG	6.9 U	0.0063 U	0.0064 U	0.0059 U	0.008 U
Naphthalene	12	100	MG/KG	5.5 U	0.005 U	0.0013 J	0.0048	0.0064 U
N-Butylbenzene	12	100	MG/KG	1.4 U	0.0013 U	0.0013 U	0.00039 J	0.0016 U
N-Propylbenzene	3.9	100	MG/KG	1.4 U	0.0013 U	0.0013 U	0.00054 J	0.0016 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.00076 J	0.00053 J
Sec-Butylbenzene	11	100	MG/KG	0.35 J	0.0013 U	0.0013 U	0.0005 J	0.00036 J
Styrene	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
T-Butylbenzene	5.9	100	MG/KG	1.2 J	0.0025 U	0.0012 J	0.00054 J	0.0011 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-6	EP-7	EP-8	EP-9	EP-9
			Sample Date:	11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
			Sample Depth (ft bls):	11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	FD
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	2.8 U	0.0025 U	0.0026 U	0.0023 U	0.0032 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00081	0.0008 U
Toluene	0.7	100	MG/KG	1.4 U	0.0013 U	0.0013	0.0012 U	0.0016 U
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	2.1 U	0.0019 U	0.0019 U	0.0018 U	0.0024 U
Trans-1,3-Dichloropropene	--	--	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	6.9 U	0.0063 U	0.0064 U	0.0059 U	0.008 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.69 U	0.00063 U	0.00064 U	0.00059 U	0.0008 U
Trichlorofluoromethane	--	--	MG/KG	5.5 U	0.005 U	0.0051 U	0.0047 U	0.0064 U
Vinyl Acetate	--	--	MG/KG	14 U	0.013 U	0.013 U	0.012 U	0.016 U
Vinyl Chloride	0.02	0.9	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0012 U	0.0016 U
Xylenes	0.26	100	MG/KG	1.4 U	0.0013 U	0.0013 U	0.0017 J	0.00053 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-10	EP-11	EP-12	EP-13	EP-14
			Sample Date:	11/08/2022	10/20/2022	11/08/2022	12/01/2022	11/08/2022
			Sample Depth (ft bls):	14 - 16	13 - 15	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
1,1-Dichloropropene	--	--	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0022 U	0.0062	0.0026 U	0.0034 U	0.0021 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0022 U	0.00087 J	0.0026 U	0.0034 U	0.0021 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0034 U	0.0039 U	0.004 U	0.0052 U	0.0031 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
1,2-Dichloropropane	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0022 U	0.0016 J	0.0026 U	0.0034 U	0.0021 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,3-Dichloropropane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0022 U	0.0009 J	0.0026 U	0.0034 U	0.0021 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.09 U	0.1 U	0.11 U	0.14 U	0.082 U
2,2-Dichloropropane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
2-Chlorotoluene	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
2-Hexanone	--	--	MG/KG	0.011 U	0.013 U	0.013 U	0.017 U	0.01 U
4-Chlorotoluene	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
4-Ethyltoluene	--	--	MG/KG	0.0022 U	0.00057 J	0.0026 U	0.0034 U	0.0021 U
Acetone	0.05	100	MG/KG	0.027	0.013 U	0.014	0.0099 J	0.01
Acrylonitrile	--	--	MG/KG	0.0045 U	0.0052 U	0.0053 U	0.0069 U	0.0041 U
Benzene	0.06	4.8	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00018 J
Bromobenzene	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-10	EP-11	EP-12	EP-13	EP-14
			Sample Date:	11/08/2022	10/20/2022	11/08/2022	12/01/2022	11/08/2022
			Sample Depth (ft bls):	14 - 16	13 - 15	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
Bromodichloromethane	--	--	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
Bromoform	--	--	MG/KG	0.0045 U	0.0052 U	0.0053 U	0.0069 U	0.0041 U
Bromomethane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
Carbon Disulfide	--	--	MG/KG	0.011 U	0.013 U	0.013 U	0.014 J	0.01 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Chlorobenzene	1.1	100	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
Chloroethane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
Chloroform	0.37	49	MG/KG	0.0017 U	0.0019 U	0.002 U	0.0026 U	0.0015 U
Chloromethane	--	--	MG/KG	0.0045 U	0.0052 U	0.0053 U	0.0069 U	0.0041 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
Cymene	--	--	MG/KG	0.0011 U	0.0015	0.00023 J	0.0017 U	0.01
Dibromochloromethane	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Dibromomethane	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
Dichlorodifluoromethane	--	--	MG/KG	0.011 U	0.013 U	0.013 U	0.017 U	0.01 U
Dichloroethylenes	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
Ethylbenzene	1	41	MG/KG	0.0011 U	0.00075 J	0.0013 U	0.0017 U	0.00018 J
Hexachlorobutadiene	--	--	MG/KG	0.0045 U	0.0052 U	0.0053 U	0.0069 U	0.0041 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
m,p-Xylene	--	--	MG/KG	0.0022 U	0.0026 U	0.0026 U	0.0034 U	0.0021 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.011 U	0.013 U	0.013 U	0.017 U	0.01 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.011 U	0.013 U	0.013 U	0.017 U	0.01 U
Methylene Chloride	0.05	100	MG/KG	0.0056 U	0.0064 U	0.0066 U	0.0086 U	0.0052 U
Naphthalene	12	100	MG/KG	0.0045 U	0.0056	0.0053 U	0.0069 U	0.0041 U
N-Butylbenzene	12	100	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
N-Propylbenzene	3.9	100	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0011 U	0.00051 J	0.0013 U	0.0017 U	0.001 U
Sec-Butylbenzene	11	100	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Styrene	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
T-Butylbenzene	5.9	100	MG/KG	0.0022 U	0.00091 J	0.0026 U	0.0034 U	0.0021 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-10	EP-11	EP-12	EP-13	EP-14
			Sample Date:	11/08/2022	10/20/2022	11/08/2022	12/01/2022	11/08/2022
			Sample Depth (ft bls):	14 - 16	13 - 15	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0022 U	0.0026 U	0.0013 J	0.0034 U	0.00029 J
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.0019	0.00064 U	0.00066 U	0.00086 U	0.00052 U
Toluene	0.7	100	MG/KG	0.0011 U	0.0016	0.00092 J	0.0017 U	0.0007 J
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0017 U	0.0019 U	0.002 U	0.0026 U	0.0015 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0056 U	0.0064 U	0.0066 U	0.0086 U	0.0052 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00056 U	0.00064 U	0.00066 U	0.00086 U	0.00052 U
Trichlorofluoromethane	--	--	MG/KG	0.0045 U	0.0052 U	0.0053 U	0.0069 U	0.0041 U
Vinyl Acetate	--	--	MG/KG	0.011 U	0.013 U	0.013 U	0.017 U	0.01 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0011 U	0.0013 U	0.0013 U	0.0017 U	0.001 U
Xylenes	0.26	100	MG/KG	0.0011 U	0.00051 J	0.0013 U	0.0017 U	0.001 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18	EP-19
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
1,1-Dichloropropene	--	--	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.042 J	0.003 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.086 J	0.003 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.005 U	0.0048 U	0.0033 U	0.21 U	0.0045 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
1,2-Dichloropropane	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.058 J	0.003 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,3-Dichloropropane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.13 U	0.13 U	0.089 U	5.5 U	0.12 U
2,2-Dichloropropane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
2-Chlorotoluene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
2-Hexanone	--	--	MG/KG	0.017 U	0.016 U	0.011 U	0.69 U	0.015 U
4-Chlorotoluene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
4-Ethyltoluene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.044 J	0.003 U
Acetone	0.05	100	MG/KG	0.012 J	0.018	0.011 U	**0.43 J**	0.025
Acrylonitrile	--	--	MG/KG	0.0067 U	0.0064 U	0.0044 U	0.28 U	0.006 U
Benzene	0.06	4.8	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Bromobenzene	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18	EP-19
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
Bromodichloromethane	--	--	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Bromoform	--	--	MG/KG	0.0067 U	0.0064 U	0.0044 U	0.28 U	0.006 U
Bromomethane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
Carbon Disulfide	--	--	MG/KG	0.017 U	0.016 U	0.011 U	0.69 U	0.0091 J
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Chlorobenzene	1.1	100	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Chloroethane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
Chloroform	0.37	49	MG/KG	0.0025 U	0.0024 U	0.0017 U	0.1 U	0.0022 U
Chloromethane	--	--	MG/KG	0.0067 U	0.0064 U	0.0044 U	0.28 U	0.006 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Cymene	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.35	0.0015 U
Dibromochloromethane	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Dibromomethane	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
Dichlorodifluoromethane	--	--	MG/KG	0.017 U	0.016 U	0.011 U	0.69 U	0.015 U
Dichloroethylenes	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U
Ethylbenzene	1	41	MG/KG	0.0017 U	0.0005 J	0.0011 U	0.012 J	0.0015 U
Hexachlorobutadiene	--	--	MG/KG	0.0067 U	0.0064 U	0.0044 U	0.28 U	0.006 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
m,p-Xylene	--	--	MG/KG	0.00097 J	0.0032 U	0.0022 U	0.14 U	0.003 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.017 U	0.016 U	0.011 U	0.69 U	0.0033 J
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.017 U	0.016 U	0.011 U	0.69 U	0.015 U
Methylene Chloride	0.05	100	MG/KG	0.0083 U	0.008 U	0.0055 U	0.35 U	0.0075 U
Naphthalene	12	100	MG/KG	0.0014 J	0.0034 J	0.0044 U	9.2	0.006 U
N-Butylbenzene	12	100	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
N-Propylbenzene	3.9	100	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.00082 J	0.00052 J	0.0011 U	0.069 U	0.00048 J
Sec-Butylbenzene	11	100	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Styrene	--	--	MG/KG	0.0017 U	0.00034 J	0.0011 U	0.069 U	0.0015 U
T-Butylbenzene	5.9	100	MG/KG	0.0033 U	0.0032 U	0.0022 U	0.14 U	0.003 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18	EP-19
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0044	0.0032 U	0.0022 U	0.14 U	0.00084 J
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Toluene	0.7	100	MG/KG	0.0034	0.0039	0.0024	0.069 U	0.0021
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0025 U	0.0024 U	0.0017 U	0.1 U	0.0022 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0083 U	0.008 U	0.0055 U	0.35 U	0.0075 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00083 U	0.0008 U	0.00055 U	0.035 U	0.00075 U
Trichlorofluoromethane	--	--	MG/KG	0.0067 U	0.0064 U	0.0044 U	0.28 U	0.006 U
Vinyl Acetate	--	--	MG/KG	0.017 U	0.016 U	0.011 U	0.69 U	0.015 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0017 U	0.0016 U	0.0011 U	0.069 U	0.0015 U
Xylenes	0.26	100	MG/KG	0.0018 J	0.00052 J	0.0011 U	0.069 U	0.00048 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: EP-20	EP-21	EP-22	EP-23	EP-24
				Sample Date: 10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
				Sample Depth (ft bls): 11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
				Normal Sample or Field Duplicate: N	N	N	N	N
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
1,1-Dichloropropene	--	--	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0025 U	0.0025 U	0.0092	0.0026 U	0.0024 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0037 U	0.0038 U	0.0038 U	0.004 U	0.0036 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
1,2-Dichloropropane	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0025 U	0.0025 U	0.00029 J	0.0026 U	0.0024 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,3-Dichloropropane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.1 U	0.1 U	0.1 U	0.1 U	0.095 U
2,2-Dichloropropane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
2-Chlorotoluene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
2-Hexanone	--	--	MG/KG	0.012 U	0.013 U	0.013 U	0.013 U	0.012 U
4-Chlorotoluene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
4-Ethyltoluene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Acetone	0.05	100	MG/KG	0.012 U	0.013 U	0.011 J	0.013 U	0.0089 J
Acrylonitrile	--	--	MG/KG	0.005 U	0.0051 U	0.0051 U	0.0053 U	0.0048 U
Benzene	0.06	4.8	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
Bromobenzene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: EP-20	EP-21	EP-22	EP-23	EP-24
				Sample Date: 10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
				Sample Depth (ft bls): 11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
				Normal Sample or Field Duplicate: N	N	N	N	N
Bromochloromethane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Bromodichloromethane	--	--	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
Bromoform	--	--	MG/KG	0.005 U	0.0051 U	0.0051 U	0.0053 U	0.0048 U
Bromomethane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Carbon Disulfide	--	--	MG/KG	0.012 U	0.013 U	0.013 U	0.013 U	0.012 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Chlorobenzene	1.1	100	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
Chloroethane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Chloroform	0.37	49	MG/KG	0.0019 U	0.0019 U	0.0019 U	0.002 U	0.0018 U
Chloromethane	--	--	MG/KG	0.005 U	0.0051 U	0.0051 U	0.0053 U	0.0048 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
Cymene	--	--	MG/KG	0.0012 U	0.00023 J	0.0022	0.0013 U	0.0012 U
Dibromochloromethane	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Dibromomethane	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Dichlorodifluoromethane	--	--	MG/KG	0.012 U	0.013 U	0.013 U	0.013 U	0.012 U
Dichloroethylenes	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Ethylbenzene	1	41	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Hexachlorobutadiene	--	--	MG/KG	0.005 U	0.0051 U	0.0051 U	0.0053 U	0.0048 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
m,p-Xylene	--	--	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.012 U	0.013 U	0.013 U	0.013 U	0.012 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.012 U	0.013 U	0.013 U	0.013 U	0.012 U
Methylene Chloride	0.05	100	MG/KG	0.0062 U	0.0063 U	0.0064 U	0.0066 U	0.006 U
Naphthalene	12	100	MG/KG	0.005 U	0.0051 U	0.0024 J	0.0053 U	0.0018 J
N-Butylbenzene	12	100	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
N-Propylbenzene	3.9	100	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Sec-Butylbenzene	11	100	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Styrene	--	--	MG/KG	0.0012 U	0.0013 U	0.00041 J	0.0013 U	0.0012 U
T-Butylbenzene	5.9	100	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-20	EP-21	EP-22	EP-23	EP-24
			Sample Date:	10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
			Sample Depth (ft bls):	11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0024 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.0017	0.0006 U
Toluene	0.7	100	MG/KG	0.0012 U	0.0013 U	0.0016	0.00077 J	0.00094 J
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0019 U	0.0019 U	0.0019 U	0.002 U	0.0018 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0062 U	0.0063 U	0.0064 U	0.0066 U	0.006 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00062 U	0.00063 U	0.00064 U	0.00066 U	0.0006 U
Trichlorofluoromethane	--	--	MG/KG	0.005 U	0.0051 U	0.0051 U	0.0053 U	0.0048 U
Vinyl Acetate	--	--	MG/KG	0.012 U	0.013 U	0.013 U	0.013 U	0.012 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U
Xylenes	0.26	100	MG/KG	0.0012 U	0.0013 U	0.0013 U	0.0013 U	0.0012 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
1,1-Dichloropropene	--	--	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0019 J	0.0025 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0036 U	0.0037 U	0.0035 U	0.0036 U	0.0038 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
1,2-Dichloropropane	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,3-Dichloropropane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.097 U	0.098 U	0.093 U	0.097 U	0.1 U
2,2-Dichloropropane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
2-Chlorotoluene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
2-Hexanone	--	--	MG/KG	0.012 U	0.012 U	0.012 U	0.012 U	0.013 U
4-Chlorotoluene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
4-Ethyltoluene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Acetone	0.05	100	MG/KG	0.01 J	0.036	0.012 U	0.033	0.021
Acrylonitrile	--	--	MG/KG	0.0048 U	0.0049 U	0.0046 U	0.0049 U	0.0051 U
Benzene	0.06	4.8	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00025 J	0.00063 U
Bromobenzene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Bromodichloromethane	--	--	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
Bromoform	--	--	MG/KG	0.0048 U	0.0049 U	0.0046 U	0.0049 U	0.0051 U
Bromomethane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Carbon Disulfide	--	--	MG/KG	0.012 U	0.012 U	0.012 U	0.012 U	0.013 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Chlorobenzene	1.1	100	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
Chloroethane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Chloroform	0.37	49	MG/KG	0.0018 U	0.0018 U	0.0017 U	0.0018 U	0.0019 U
Chloromethane	--	--	MG/KG	0.0048 U	0.0049 U	0.0046 U	0.0049 U	0.0051 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
Cymene	--	--	MG/KG	0.0012 U	0.0021	0.00014 J	0.0024	0.0026
Dibromochloromethane	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Dibromomethane	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Dichlorodifluoromethane	--	--	MG/KG	0.012 U	0.012 U	0.012 U	0.012 U	0.013 U
Dichloroethylenes	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Ethylbenzene	1	41	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Hexachlorobutadiene	--	--	MG/KG	0.0048 U	0.0049 U	0.0046 U	0.0049 U	0.0051 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
m,p-Xylene	--	--	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.001 J	0.0025 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.012 U	0.012 U	0.012 U	0.012 U	0.013 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.012 U	0.012 U	0.012 U	0.012 U	0.013 U
Methylene Chloride	0.05	100	MG/KG	0.0061 U	0.0062 U	0.0058 U	0.0061 U	0.0063 U
Naphthalene	12	100	MG/KG	0.0048 U	0.0049 U	0.0046 U	0.0055	0.003 J
N-Butylbenzene	12	100	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
N-Propylbenzene	3.9	100	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0011 J	0.0013 U
Sec-Butylbenzene	11	100	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Styrene	--	--	MG/KG	0.0012 U	0.00032 J	0.0012 U	0.0012 U	0.0013 U
T-Butylbenzene	5.9	100	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0024 U	0.0025 U	0.0023 U	0.0024 U	0.0025 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
Toluene	0.7	100	MG/KG	0.0013	0.0031	0.00084 J	0.0011 J	0.0022
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0018 U	0.0018 U	0.0017 U	0.0018 U	0.0019 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0061 U	0.0062 U	0.0058 U	0.0061 U	0.0063 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00061 U	0.00062 U	0.00058 U	0.00061 U	0.00063 U
Trichlorofluoromethane	--	--	MG/KG	0.0048 U	0.0049 U	0.0046 U	0.0049 U	0.0051 U
Vinyl Acetate	--	--	MG/KG	0.012 U	0.012 U	0.012 U	0.012 U	0.013 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0013 U
Xylenes	0.26	100	MG/KG	0.0012 U	0.0012 U	0.0012 U	0.0021 J	0.0013 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
1,1-Dichloropropene	--	--	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0013 J	0.0028 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0025 U	0.0012 J	0.0021 U	0.013	0.0028 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0038 U	0.0036 U	0.0032 U	0.0046 U	0.0042 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
1,2-Dichloropropane	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0025 U	0.0013 J	0.0021 U	0.0061	0.0028 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,3-Dichloropropane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0052	0.0028 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.1 U	0.096 U	0.086 U	0.12 U	0.11 U
2,2-Dichloropropane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
2-Chlorotoluene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
2-Hexanone	--	--	MG/KG	0.012 U	0.0018 J	0.011 U	0.015 U	0.014 U
4-Chlorotoluene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
4-Ethyltoluene	--	--	MG/KG	0.0025 U	0.00078 J	0.0021 U	0.0053	0.0028 U
Acetone	0.05	100	MG/KG	**0.11**	**0.17**	**0.082**	**0.073**	0.014 U
Acrylonitrile	--	--	MG/KG	0.005 U	0.0048 U	0.0043 U	0.0061 U	0.0056 U
Benzene	0.06	4.8	MG/KG	0.00063 U	0.00063	0.00054 U	0.00077 U	0.0007 U
Bromobenzene	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
Bromodichloromethane	--	--	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
Bromoform	--	--	MG/KG	0.005 U	0.0048 U	0.0043 U	0.0061 U	0.0056 U
Bromomethane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
Carbon Disulfide	--	--	MG/KG	0.012 U	0.012 U	0.011 U	0.015 U	0.014 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
Chlorobenzene	1.1	100	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
Chloroethane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
Chloroform	0.37	49	MG/KG	0.0019 U	0.00067 J	0.0016 U	0.0023 U	0.0021 U
Chloromethane	--	--	MG/KG	0.005 U	0.0048 U	0.0043 U	0.0061 U	0.0056 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
Cymene	--	--	MG/KG	0.00023 J	0.039	0.00017 J	0.26	0.0014 U
Dibromochloromethane	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
Dibromomethane	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
Dichlorodifluoromethane	--	--	MG/KG	0.012 U	0.012 U	0.011 U	0.015 U	0.014 U
Dichloroethylenes	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
Ethylbenzene	1	41	MG/KG	0.0012 U	0.00028 J	0.0011 U	0.00099 J	0.0014 U
Hexachlorobutadiene	--	--	MG/KG	0.005 U	0.0048 U	0.0043 U	0.0061 U	0.0056 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.00065 J	0.0014 U
m,p-Xylene	--	--	MG/KG	0.0025 U	0.0016 J	0.0021 U	0.0056	0.0028 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.01 J	0.018	0.0062 J	0.005 J	0.014 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.012 U	0.012 U	0.011 U	0.015 U	0.014 U
Methylene Chloride	0.05	100	MG/KG	0.0063 U	0.006 U	0.0054 U	0.0077 U	0.007 U
Naphthalene	12	100	MG/KG	0.005 U	0.0058	0.0043 U	0.005 J	0.0056 U
N-Butylbenzene	12	100	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.00058 J	0.0014 U
N-Propylbenzene	3.9	100	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0013 J	0.0014 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0012 U	0.0015	0.0011 U	0.003	0.0014 U
Sec-Butylbenzene	11	100	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.00055 J	0.0014 U
Styrene	--	--	MG/KG	0.00046 J	0.00038 J	0.00036 J	0.00033 J	0.0014 U
T-Butylbenzene	5.9	100	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0025 U	0.0024 U	0.0021 U	0.0031 U	0.0028 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
Toluene	0.7	100	MG/KG	0.003	0.0031	0.0029	0.0015 U	0.0014 U
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0019 U	0.0018 U	0.0016 U	0.0023 U	0.0021 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0063 U	0.006 U	0.0054 U	0.0077 U	0.007 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00063 U	0.0006 U	0.00054 U	0.00077 U	0.0007 U
Trichlorofluoromethane	--	--	MG/KG	0.005 U	0.0048 U	0.0043 U	0.0061 U	0.0056 U
Vinyl Acetate	--	--	MG/KG	0.012 U	0.012 U	0.011 U	0.015 U	0.014 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0012 U	0.0012 U	0.0011 U	0.0015 U	0.0014 U
Xylenes	0.26	100	MG/KG	0.0012 U	0.0031 J	0.0011 U	0.0086	0.0014 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
1,1-Dichloropropene	--	--	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0026 U	0.0079	0.0036 U	0.00066 J	0.00029 J
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0017 J	0.0017 J
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0039 U	0.0038 U	0.0054 U	0.0052 U	0.0042 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
1,2-Dichloropropane	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0026 U	0.00031 J	0.0036 U	0.0007 J	0.00082 J
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,3-Dichloropropane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0026 U	0.00091 J	0.0036 U	0.0014 J	0.0028 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.1 U	0.1 U	0.14 U	0.14 U	0.11 U
2,2-Dichloropropane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
2-Chlorotoluene	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
2-Hexanone	--	--	MG/KG	0.013 U	0.013 U	0.018 U	0.017 U	0.014 U
4-Chlorotoluene	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
4-Ethyltoluene	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0011 J	0.0012 J
Acetone	0.05	100	MG/KG	0.0078 J	0.03	**0.091**	**0.49**	0.028
Acrylonitrile	--	--	MG/KG	0.0052 U	0.0051 U	0.0072 U	0.007 U	0.0057 U
Benzene	0.06	4.8	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Bromobenzene	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
Bromodichloromethane	--	--	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Bromoform	--	--	MG/KG	0.0052 U	0.0051 U	0.0072 U	0.007 U	0.0057 U
Bromomethane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
Carbon Disulfide	--	--	MG/KG	0.013 U	0.013 U	0.018 U	0.0083 J	0.014 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
Chlorobenzene	1.1	100	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Chloroethane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
Chloroform	0.37	49	MG/KG	0.0019 U	0.0019 U	0.0027 U	0.0026 U	0.0021 U
Chloromethane	--	--	MG/KG	0.0052 U	0.0051 U	0.0072 U	0.007 U	0.0057 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Cymene	--	--	MG/KG	0.0012 J	0.0047	0.0018 U	0.0081	0.0079
Dibromochloromethane	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
Dibromomethane	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
Dichlorodifluoromethane	--	--	MG/KG	0.013 U	0.013 U	0.018 U	0.017 U	0.014 U
Dichloroethylenes	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
Ethylbenzene	1	41	MG/KG	0.0013 U	0.0013 U	0.0016 J	0.0043	0.0013 J
Hexachlorobutadiene	--	--	MG/KG	0.0052 U	0.0051 U	0.0072 U	0.007 U	0.0057 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.00025 J	0.0014 U
m,p-Xylene	--	--	MG/KG	0.0026 U	0.0025 U	0.0066	0.02	0.0031
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.013 U	0.013 U	0.0097 J	0.081	0.014 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.013 U	0.013 U	0.018 U	0.017 U	0.014 U
Methylene Chloride	0.05	100	MG/KG	0.0065 U	0.0064 U	0.0089 U	0.0087 U	0.0071 U
Naphthalene	12	100	MG/KG	0.0052 U	0.00093 J	0.0072 U	0.013	0.25
N-Butylbenzene	12	100	MG/KG	0.0013 U	0.00037 J	0.0018 U	0.00038 J	0.0014 U
N-Propylbenzene	3.9	100	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0013 U	0.0013 U	0.0022	0.0049	0.0014
Sec-Butylbenzene	11	100	MG/KG	0.0013 U	0.00025 J	0.0018 U	0.0017 U	0.0014 U
Styrene	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
T-Butylbenzene	5.9	100	MG/KG	0.0026 U	0.001 J	0.0036 U	0.0035 U	0.0028 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0026 U	0.0025 U	0.0036 U	0.0035 U	0.0028 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Toluene	0.7	100	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0044	0.0014
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0019 U	0.0019 U	0.0027 U	0.0026 U	0.0021 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0065 U	0.0064 U	0.0089 U	0.0087 U	0.0071 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00065 U	0.00064 U	0.00089 U	0.00087 U	0.00071 U
Trichlorofluoromethane	--	--	MG/KG	0.0052 U	0.0051 U	0.0072 U	0.007 U	0.0057 U
Vinyl Acetate	--	--	MG/KG	0.013 U	0.013 U	0.018 U	0.017 U	0.014 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0013 U	0.0013 U	0.0018 U	0.0017 U	0.0014 U
Xylenes	0.26	100	MG/KG	0.0013 U	0.0013 U	0.0088	0.025	0.0045

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
1,1-Dichloropropene	--	--	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,2,3-Trichloropropane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.003 U	0.0014 J	0.0051	0.0064	0.013
1,2,4-Trichlorobenzene	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.003 U	0.00059 J	0.0055	0.008	0.0013 J
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0046 U	0.0042 U	0.0033 U	0.0033 U	0.0039 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
1,2-Dichloropropane	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.003 U	0.00072 J	0.0029	0.0054	0.00098 J
1,3-Dichlorobenzene	2.4	49	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,3-Dichloropropane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
1,4-Diethyl Benzene	--	--	MG/KG	0.003 U	0.00061 J	0.0022 U	0.0022 U	0.0033
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.12 U	0.11 U	0.088 U	0.088 U	0.1 U
2,2-Dichloropropane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
2-Chlorotoluene	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
2-Hexanone	--	--	MG/KG	0.015 U	0.014 U	0.011 U	0.011 U	0.013 U
4-Chlorotoluene	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
4-Ethyltoluene	--	--	MG/KG	0.003 U	0.0028 U	0.00057 J	0.00076 J	0.0026 U
Acetone	0.05	100	MG/KG	0.013 J	0.014 U	0.018	0.034	0.011 J
Acrylonitrile	--	--	MG/KG	0.0061 U	0.0056 U	0.0044 U	0.0044 U	0.0052 U
Benzene	0.06	4.8	MG/KG	0.00076 U	0.00084	0.00046 J	0.0015	0.0032
Bromobenzene	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
Bromodichloromethane	--	--	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
Bromoform	--	--	MG/KG	0.0061 U	0.0056 U	0.0044 U	0.0044 U	0.0052 U
Bromomethane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
Carbon Disulfide	--	--	MG/KG	0.015 U	0.014 U	0.011 U	0.0051 J	0.013 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
Chlorobenzene	1.1	100	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
Chloroethane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
Chloroform	0.37	49	MG/KG	0.0023 U	0.0021 U	0.0016 U	0.0016 U	0.002 U
Chloromethane	--	--	MG/KG	0.0061 U	0.0056 U	0.0044 U	0.0044 U	0.0052 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
Cymene	--	--	MG/KG	0.0015 U	0.014	0.013	0.029	0.0044
Dibromochloromethane	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
Dibromomethane	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
Dichlorodifluoromethane	--	--	MG/KG	0.015 U	0.014 U	0.011 U	0.011 U	0.013 U
Dichloroethylenes	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.0026 U
Ethylbenzene	1	41	MG/KG	0.00027 J	0.0014 U	0.0025	0.0076	0.0026
Hexachlorobutadiene	--	--	MG/KG	0.0061 U	0.0056 U	0.0044 U	0.0044 U	0.0052 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0015 U	0.0014 U	0.00032 J	0.00039 J	0.00035 J
m,p-Xylene	--	--	MG/KG	0.00091 J	0.00091 J	0.003	0.0048	0.0022 J
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.015 U	0.014 U	0.0046 J	0.003 J	0.013 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.015 U	0.014 U	0.011 U	0.011 U	0.013 U
Methylene Chloride	0.05	100	MG/KG	0.0076 U	0.007 U	0.0055 U	0.0055 U	0.0065 U
Naphthalene	12	100	MG/KG	0.0061 U	0.0045 J	0.11	0.24	0.038
N-Butylbenzene	12	100	MG/KG	0.0015 U	0.0014 U	0.0014	0.0035	0.0025
N-Propylbenzene	3.9	100	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0015 U	0.001 J	0.0022	0.0041	0.0015
Sec-Butylbenzene	11	100	MG/KG	0.0015 U	0.0014 U	0.0004 J	0.00064 J	0.0022
Styrene	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.00026 J	0.0013 U
T-Butylbenzene	5.9	100	MG/KG	0.003 U	0.00064 J	0.0013 J	0.0027	0.0018 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.003 U	0.0028 U	0.0022 U	0.0022 U	0.00045 J
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
Toluene	0.7	100	MG/KG	0.0015 U	0.0014 U	0.00091 J	0.0016	0.0014
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0023 U	0.0021 U	0.0016 U	0.0016 U	0.002 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0076 U	0.007 U	0.0055 U	0.0055 U	0.0065 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00076 U	0.0007 U	0.00055 U	0.00055 U	0.00065 U
Trichlorofluoromethane	--	--	MG/KG	0.0061 U	0.0056 U	0.0044 U	0.0044 U	0.0052 U
Vinyl Acetate	--	--	MG/KG	0.015 U	0.014 U	0.011 U	0.011 U	0.013 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0015 U	0.0014 U	0.0011 U	0.0011 U	0.0013 U
Xylenes	0.26	100	MG/KG	0.00091 J	0.0019 J	0.0052	0.0089	0.0037 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-12	SW-13	SW-14	SW-14	SW-15
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
1,1-Dichloropropene	--	--	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.00041 J	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.00094 J	0.0023 U	0.00042 J	0.0022 U	0.0023 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0025 U	0.0023 U	0.0013 J	0.0022 U	0.0023 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0038 U	0.0035 U	0.0029 U	0.0033 U	0.0034 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
1,2-Dichloropropane	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.00024 J	0.0023 U	0.00064 J	0.0022 U	0.00023 J
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,3-Dichloropropane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.00019 J	0.0023 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.1 U	0.094 U	0.078 U	0.088 U	0.091 U
2,2-Dichloropropane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
2-Chlorotoluene	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
2-Hexanone	--	--	MG/KG	0.012 U	0.012 U	0.0097 U	0.011 U	0.011 U
4-Chlorotoluene	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
4-Ethyltoluene	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
Acetone	0.05	100	MG/KG	0.026	0.012 U	0.019	0.024	0.023
Acrylonitrile	--	--	MG/KG	0.005 U	0.0022 J	0.0039 U	0.0044 U	0.0046 U
Benzene	0.06	4.8	MG/KG	0.0058	0.0003 J	0.00049 U	0.00055 U	0.00057 U
Bromobenzene	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	SW-12	SW-13	SW-14	SW-14	SW-15
Sample Date:				12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
Sample Depth (ft bls):				15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
Normal Sample or Field Duplicate:				N	N	N	N	N
Bromochloromethane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
Bromodichloromethane	--	--	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
Bromoform	--	--	MG/KG	0.005 U	0.0047 U	0.0039 U	0.0044 U	0.0046 U
Bromomethane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
Carbon Disulfide	--	--	MG/KG	0.012 U	0.0089 J	0.0097 U	0.011 U	0.011 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Chlorobenzene	1.1	100	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
Chloroethane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
Chloroform	0.37	49	MG/KG	0.0019 U	0.0018 U	0.0014 U	0.0016 U	0.0017 U
Chloromethane	--	--	MG/KG	0.005 U	0.0047 U	0.0039 U	0.0044 U	0.0046 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
Cymene	--	--	MG/KG	0.0005 J	0.0012 U	0.01	0.0011 U	0.0016
Dibromochloromethane	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Dibromomethane	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
Dichlorodifluoromethane	--	--	MG/KG	0.012 U	0.012 U	0.0097 U	0.011 U	0.011 U
Dichloroethylenes	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0025 U	0.0023 U	0.0019 U	0.0022 U	0.0023 U
Ethylbenzene	1	41	MG/KG	0.0012 U	0.0012 U	0.00041 J	0.0011 U	0.00046 J
Hexachlorobutadiene	--	--	MG/KG	0.005 U	0.0047 U	0.0039 U	0.0044 U	0.0046 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.00038 J	0.0012 U	0.00097 U	0.0011 U	0.0011 U
m,p-Xylene	--	--	MG/KG	0.00098 J	0.0023 U	0.001 J	0.0022 U	0.00077 J
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.012 U	0.012 U	0.0039 J	0.0024 J	0.0054 J
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.012 U	0.012 U	0.0097 U	0.011 U	0.011 U
Methylene Chloride	0.05	100	MG/KG	0.0063 U	0.0058 U	0.0049 U	0.0055 U	0.0057 U
Naphthalene	12	100	MG/KG	0.0013 J	0.0047 U	0.26	0.0009 J	0.02
N-Butylbenzene	12	100	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
N-Propylbenzene	3.9	100	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0011 J	0.0012 U	0.00053 J	0.0011 U	0.00039 J
Sec-Butylbenzene	11	100	MG/KG	0.00029 J	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Styrene	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
T-Butylbenzene	5.9	100	MG/KG	0.00024 J	0.0023 U	0.0019 U	0.0022 U	0.0023 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-12	SW-13	SW-14	SW-14	SW-15
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0025 U	0.024	0.0011 J	0.0003 J	0.0022 J
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
Toluene	0.7	100	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0019 U	0.0018 U	0.0014 U	0.0016 U	0.0017 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0063 U	0.0058 U	0.0049 U	0.0055 U	0.0057 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00063 U	0.00058 U	0.00049 U	0.00055 U	0.00057 U
Trichlorofluoromethane	--	--	MG/KG	0.005 U	0.0047 U	0.0039 U	0.0044 U	0.0046 U
Vinyl Acetate	--	--	MG/KG	0.012 U	0.012 U	0.0097 U	0.011 U	0.011 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0012 U	0.0012 U	0.00097 U	0.0011 U	0.0011 U
Xylenes	0.26	100	MG/KG	0.0021 J	0.0012 U	0.0015 J	0.0011 U	0.0012 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
1,1-Dichloropropene	--	--	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,2,3-Trichloropropane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.003 U	0.0022 U	0.0008 J	0.0025 U	0.033
1,2,4-Trichlorobenzene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.008
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0046 U	0.0034 U	0.0034 U	0.0038 U	0.0042 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
1,2-Dichloropropane	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.005
1,3-Dichlorobenzene	2.4	49	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,3-Dichloropropane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
1,4-Diethyl Benzene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0045
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.12 U	0.09 U	0.091 U	0.1 U	0.11 U
2,2-Dichloropropane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
2-Chlorotoluene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
2-Hexanone	--	--	MG/KG	0.015 U	0.011 U	0.011 U	0.012 U	0.014 U
4-Chlorotoluene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
4-Ethyltoluene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0027 J
Acetone	0.05	100	MG/KG	0.016	0.0061 J	0.011 U	0.026	0.011 J
Acrylonitrile	--	--	MG/KG	0.0061 U	0.0045 U	0.0045 U	0.005 U	0.0056 U
Benzene	0.06	4.8	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Bromobenzene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
Bromodichloromethane	--	--	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Bromoform	--	--	MG/KG	0.0061 U	0.0045 U	0.0045 U	0.005 U	0.0056 U
Bromomethane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
Carbon Disulfide	--	--	MG/KG	0.015 U	0.011 U	0.0067 J	0.012 U	0.014 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Chlorobenzene	1.1	100	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Chloroethane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
Chloroform	0.37	49	MG/KG	0.0023 U	0.0017 U	0.0017 U	0.0019 U	0.0021 U
Chloromethane	--	--	MG/KG	0.0061 U	0.0045 U	0.0045 U	0.005 U	0.0056 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Cymene	--	--	MG/KG	0.0015 U	0.0011 U	0.00031 J	0.0012 U	0.0059
Dibromochloromethane	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Dibromomethane	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
Dichlorodifluoromethane	--	--	MG/KG	0.015 U	0.011 U	0.011 U	0.012 U	0.014 U
Dichloroethylenes	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
Ethylbenzene	1	41	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Hexachlorobutadiene	--	--	MG/KG	0.0061 U	0.0045 U	0.0045 U	0.005 U	0.0056 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.00015 J
m,p-Xylene	--	--	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0035
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.015 U	0.011 U	0.011 U	0.012 U	0.014 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.015 U	0.011 U	0.011 U	0.012 U	0.014 U
Methylene Chloride	0.05	100	MG/KG	0.0076 U	0.0056 U	0.0057 U	0.0062 U	0.007 U
Naphthalene	12	100	MG/KG	0.0061 U	0.0045 U	0.0045 U	0.005 U	0.13
N-Butylbenzene	12	100	MG/KG	0.0015 U	0.0011 U	0.00023 J	0.0012 U	0.0014 U
N-Propylbenzene	3.9	100	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0015 U	0.00036 J	0.0011 U	0.0012 U	0.0039
Sec-Butylbenzene	11	100	MG/KG	0.0015 U	0.0011 U	0.00026 J	0.0012 U	0.0009 J
Styrene	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
T-Butylbenzene	5.9	100	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0017 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.003 U	0.0022 U	0.0023 U	0.0025 U	0.0028 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Toluene	0.7	100	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0023 U	0.0017 U	0.0017 U	0.0019 U	0.0021 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0076 U	0.0056 U	0.0057 U	0.0062 U	0.007 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00076 U	0.00056 U	0.00057 U	0.00062 U	0.0007 U
Trichlorofluoromethane	--	--	MG/KG	0.0061 U	0.0045 U	0.0045 U	0.005 U	0.0056 U
Vinyl Acetate	--	--	MG/KG	0.015 U	0.011 U	0.011 U	0.012 U	0.014 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0015 U	0.0011 U	0.0011 U	0.0012 U	0.0014 U
Xylenes	0.26	100	MG/KG	0.0015 U	0.00036 J	0.0011 U	0.0012 U	0.0074

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,1,1,2-Tetrachloroethane	--	--	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
1,1,1-Trichloroethane (TCA)	0.68	100	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
1,1,2,2-Tetrachloroethane	--	--	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
1,1,2-Trichloroethane	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
1,1-Dichloroethane	0.27	26	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
1,1-Dichloroethene	0.33	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
1,1-Dichloropropene	--	--	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
1,2,3-Trichlorobenzene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,2,3-Trichloropropane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,2,4,5-Tetramethylbenzene	--	--	MG/KG	0.0029 U	0.0027 U	0.0031	5.2	0.0011 J
1,2,4-Trichlorobenzene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,2,4-Trimethylbenzene	3.6	52	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,2-Dibromo-3-Chloropropane	--	--	MG/KG	0.0043 U	0.004 U	0.0039 U	0.21 U	0.0035 U
1,2-Dibromoethane (Ethylene Dibromide)	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,2-Dichloroethane	0.02	3.1	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
1,2-Dichloropropane	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,3-Dichloropropane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
1,4-Diethyl Benzene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	1	0.0024 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.11 U	0.11 U	0.1 U	5.6 U	0.094 U
2,2-Dichloropropane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
2-Chlorotoluene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
2-Hexanone	--	--	MG/KG	0.014 U	0.014 U	0.013 U	0.71 U	0.012 U
4-Chlorotoluene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
4-Ethyltoluene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Acetone	0.05	100	MG/KG	0.01 J	0.011 J	0.013 U	0.71 U	0.015
Acrylonitrile	--	--	MG/KG	0.0057 U	0.0054 U	0.0052 U	0.28 U	0.0047 U
Benzene	0.06	4.8	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.0023
Bromobenzene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Bromochloromethane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Bromodichloromethane	--	--	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
Bromoform	--	--	MG/KG	0.0057 U	0.0054 U	0.0052 U	0.28 U	0.0047 U
Bromomethane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Carbon Disulfide	--	--	MG/KG	0.014 U	0.014 U	0.013 U	0.71 U	0.012 U
Carbon Tetrachloride	0.76	2.4	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Chlorobenzene	1.1	100	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00018 J
Chloroethane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Chloroform	0.37	49	MG/KG	0.0022 U	0.002 U	0.002 U	0.11 U	0.0018 U
Chloromethane	--	--	MG/KG	0.0057 U	0.0054 U	0.0052 U	0.28 U	0.0047 U
Cis-1,2-Dichloroethylene	0.25	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Cis-1,3-Dichloropropene	--	--	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
Cymene	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Dibromochloromethane	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Dibromomethane	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Dichlorodifluoromethane	--	--	MG/KG	0.014 U	0.014 U	0.013 U	0.71 U	0.012 U
Dichloroethylenes	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Diethyl Ether (Ethyl Ether)	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Ethylbenzene	1	41	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Hexachlorobutadiene	--	--	MG/KG	0.0057 U	0.0054 U	0.0052 U	0.28 U	0.0047 U
Isopropylbenzene (Cumene)	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.014 J	0.0018
m,p-Xylene	--	--	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.00086 J
Methyl Ethyl Ketone (2-Butanone)	0.12	100	MG/KG	0.014 U	0.014 U	0.013 U	0.71 U	0.0034 J
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	--	MG/KG	0.014 U	0.014 U	0.013 U	0.71 U	0.012 U
Methylene Chloride	0.05	100	MG/KG	0.0072 U	0.0068 U	0.0066 U	0.35 U	0.0059 U
Naphthalene	12	100	MG/KG	0.0057 U	0.0054 U	0.0015 J	0.27 J	0.001 J
N-Butylbenzene	12	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.2	0.0012 U
N-Propylbenzene	3.9	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.00029 J
O-Xylene (1,2-Dimethylbenzene)	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Sec-Butylbenzene	11	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.16	0.00028 J
Styrene	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
T-Butylbenzene	5.9	100	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.44	0.00042 J

Table 3a. Summary of Volatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Tert-Butyl Methyl Ether	0.93	100	MG/KG	0.0029 U	0.0027 U	0.0026 U	0.14 U	0.0024 U
Tetrachloroethylene (PCE)	1.3	19	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
Toluene	0.7	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Total, 1,3-Dichloropropene (Cis And Trans)	--	--	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
Trans-1,2-Dichloroethene	0.19	100	MG/KG	0.0022 U	0.002 U	0.002 U	0.11 U	0.0018 U
Trans-1,3-Dichloropropene	--	--	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Trans-1,4-Dichloro-2-Butene	--	--	MG/KG	0.0072 U	0.0068 U	0.0066 U	0.35 U	0.0059 U
Trichloroethylene (TCE)	0.47	21	MG/KG	0.00072 U	0.00068 U	0.00066 U	0.035 U	0.00059 U
Trichlorofluoromethane	--	--	MG/KG	0.0057 U	0.0054 U	0.0052 U	0.28 U	0.0047 U
Vinyl Acetate	--	--	MG/KG	0.014 U	0.014 U	0.013 U	0.71 U	0.012 U
Vinyl Chloride	0.02	0.9	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.0012 U
Xylenes	0.26	100	MG/KG	0.0014 U	0.0014 U	0.0013 U	0.071 U	0.00086 J

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.032 U	0.03 U	0.032 U	0.031 U	0.027 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.11 U
2,4-Dichlorophenol	--	--	MG/KG	0.19 U	0.18 U	0.19 U	0.19 U	0.16 U
2,4-Dimethylphenol	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2,4-Dinitrophenol	--	--	MG/KG	1 U	0.96 U	1 U	1 U	0.85 U
2,4-Dinitrotoluene	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2,6-Dinitrotoluene	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2-Chloronaphthalene	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2-Chlorophenol	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2-Methylnaphthalene	--	--	MG/KG	0.26 U	0.24 U	0.26 U	0.25 U	0.029 J
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2-Nitroaniline	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
2-Nitrophenol	--	--	MG/KG	0.47 U	0.43 U	0.46 U	0.45 U	0.38 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
3-Nitroaniline	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.56 U	0.52 U	0.55 U	0.54 U	0.46 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
4-Chloroaniline	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
4-Nitroaniline	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
4-Nitrophenol	--	--	MG/KG	0.3 U	0.28 U	0.3 U	0.29 U	0.25 U
Acenaphthene	20	100	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.19
Acenaphthylene	100	100	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.032 J
Acetophenone	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Anthracene	100	100	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.25

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.13 U	0.12 U	0.027 J	0.12 U	0.24
Benzo(A)Pyrene	1	1	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.12 J
Benzo(B)Fluoranthene	1	1	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.13
Benzo(G,H,I)Perylene	100	100	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.029 J
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.053 J
Benzoic Acid	--	--	MG/KG	0.7 U	0.65 U	0.69 U	0.68 U	0.57 U
Benzyl Alcohol	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.49 U	0.46 U	0.48 U	0.48 U	0.4 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.23 U	0.22 U	0.23 U	0.22 U	0.19 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.19 U	0.18 U	0.19 U	0.19 U	0.16 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.26 U	0.24 U	0.26 U	0.25 U	0.21 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.11 J	0.21 U	0.18 U
Carbazole	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Chrysene	1	3.9	MG/KG	0.13 U	0.12 U	0.023 J	0.12 U	0.17
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.11 U
Dibenzofuran	7	59	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.22
Diethyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Dimethyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Di-N-Octylphthalate	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Fluoranthene	100	100	MG/KG	0.13 U	0.12 U	0.043 J	0.12 U	0.58
Fluorene	30	100	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.34
Hexachlorobenzene	0.33	1.2	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.11 U
Hexachlorobutadiene	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.62 U	0.58 U	0.61 U	0.6 U	0.51 U
Hexachloroethane	--	--	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.14 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.04 J
Isophorone	--	--	MG/KG	0.19 U	0.18 U	0.19 U	0.19 U	0.16 U
M+P MethylPhenol	0.33	100	MG/KG	0.31 U	0.29 U	0.31 U	0.3 U	0.26 U
Naphthalene	12	100	MG/KG	0.058 J	0.2 U	0.21 U	0.21 U	0.18 U
Nitrobenzene	--	--	MG/KG	0.19 U	0.18 U	0.19 U	0.19 U	0.16 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.14 U
Pentachlorophenol	0.8	6.7	MG/KG	0.17 U	0.16 U	0.17 U	0.17 U	0.14 U
Phenanthrene	100	100	MG/KG	0.13 U	0.12 U	0.13 U	0.12 U	0.82
Phenol	0.33	100	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.18 U
Pyrene	100	100	MG/KG	0.13 U	0.12 U	0.042 J	0.12 U	0.46

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-6	EP-7	EP-8	EP-9	EP-9
			Sample Date:	11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
			Sample Depth (ft bls):	11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	FD
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.026 U	0.028 U	0.029 U	0.029 U	0.029 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.1 U	0.11 U	0.11 U	0.12 U	0.11 U
2,4-Dichlorophenol	--	--	MG/KG	0.16 U	0.17 U	0.17 U	0.17 U	0.17 U
2,4-Dimethylphenol	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2,4-Dinitrophenol	--	--	MG/KG	0.84 U	0.89 U	0.92 U	0.92 U	0.92 U
2,4-Dinitrotoluene	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2,6-Dinitrotoluene	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2-Chloronaphthalene	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2-Chlorophenol	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2-Methylnaphthalene	--	--	MG/KG	0.21 U	0.22 U	0.039 J	0.23 U	0.025 J
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2-Nitroaniline	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
2-Nitrophenol	--	--	MG/KG	0.38 U	0.4 U	0.41 U	0.42 U	0.41 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
3-Nitroaniline	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.46 U	0.48 U	0.5 U	0.5 U	0.5 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
4-Chloroaniline	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
4-Nitroaniline	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
4-Nitrophenol	--	--	MG/KG	0.25 U	0.26 U	0.27 U	0.27 U	0.27 U
Acenaphthene	20	100	MG/KG	0.14 U	0.023 J	0.05 J	0.15 U	0.045 J
Acenaphthylene	100	100	MG/KG	0.14 U	0.15 U	0.12 J	0.15 U	0.03 J
Acetophenone	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Anthracene	100	100	MG/KG	0.1 U	0.11 U	0.15	0.12 U	0.08 J

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-6	EP-7	EP-8	EP-9	EP-9
			Sample Date:	11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
			Sample Depth (ft bls):	11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	FD
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.021 J	0.034 J	0.4	0.026 J	0.24
Benzo(A)Pyrene	1	1	MG/KG	0.14 U	0.048 J	0.33	0.15 U	0.25
Benzo(B)Fluoranthene	1	1	MG/KG	0.1 U	0.042 J	0.37	0.12 U	0.3
Benzo(G,H,I)Perylene	100	100	MG/KG	0.14 U	0.042 J	0.16	0.15 U	0.13 J
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.1 U	0.11 U	0.13	0.12 U	0.1 J
Benzoic Acid	--	--	MG/KG	0.57 U	0.6 U	0.62 U	0.62 U	0.62 U
Benzyl Alcohol	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.4 U	0.42 U	0.44 U	0.44 U	0.44 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.19 U	0.2 U	0.21 U	0.21 U	0.21 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.16 U	0.17 U	0.17 U	0.17 U	0.17 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.21 U	0.22 U	0.23 U	0.23 U	0.23 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Carbazole	--	--	MG/KG	0.18 U	0.18 U	0.035 J	0.19 U	0.034 J
Chrysene	1	3.9	MG/KG	0.1 U	0.044 J	0.32	0.021 J	0.25
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.1 U	0.11 U	0.041 J	0.12 U	0.034 J
Dibenzofuran	7	59	MG/KG	0.18 U	0.18 U	0.059 J	0.19 U	0.033 J
Diethyl Phthalate	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Dimethyl Phthalate	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Di-N-Octylphthalate	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Fluoranthene	100	100	MG/KG	0.044 J	0.072 J	0.8	0.036 J	0.51
Fluorene	30	100	MG/KG	0.017 J	0.02 J	0.089 J	0.19 U	0.038 J
Hexachlorobenzene	0.33	1.2	MG/KG	0.1 U	0.11 U	0.11 U	0.12 U	0.11 U
Hexachlorobutadiene	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.5 U	0.53 U	0.55 U	0.55 U	0.55 U
Hexachloroethane	--	--	MG/KG	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.14 U	0.15 U	0.18	0.15 U	0.15
Isophorone	--	--	MG/KG	0.16 U	0.17 U	0.17 U	0.17 U	0.17 U
M+P MethylPhenol	0.33	100	MG/KG	0.25 U	0.03 J	0.28 U	0.28 U	0.28 U
Naphthalene	12	100	MG/KG	0.18 U	0.18 U	0.085 J	0.19 U	0.054 J
Nitrobenzene	--	--	MG/KG	0.16 U	0.17 U	0.17 U	0.17 U	0.17 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-6	EP-7	EP-8	EP-9	EP-9
			Sample Date:	11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
			Sample Depth (ft bls):	11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	FD
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U
Pentachlorophenol	0.8	6.7	MG/KG	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U
Phenanthrene	100	100	MG/KG	0.022 J	0.051 J	0.38	0.12 U	0.33
Phenol	0.33	100	MG/KG	0.18 U	0.18 U	0.19 U	0.19 U	0.19 U
Pyrene	100	100	MG/KG	0.043 J	0.13	0.7	0.032 J	0.46

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-10	EP-11	EP-12	EP-13	EP-14
			Sample Date:	11/08/2022	11/08/2022	11/08/2022	12/01/2022	11/08/2022
			Sample Depth (ft bls):	14 - 16	15 - 17	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.031 U	0.028 U	0.031 U	0.03 U	0.029 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.12 U	0.11 U	0.12 U	0.12 U	0.12 U
2,4-Dichlorophenol	--	--	MG/KG	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U
2,4-Dimethylphenol	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2,4-Dinitrophenol	--	--	MG/KG	0.99 U	0.91 U	0.99 U	0.96 U	0.94 U
2,4-Dinitrotoluene	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2,6-Dinitrotoluene	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2-Chloronaphthalene	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2-Chlorophenol	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2-Methylnaphthalene	--	--	MG/KG	0.25 U	0.08 J	0.25 U	0.24 U	0.24 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2-Nitroaniline	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
2-Nitrophenol	--	--	MG/KG	0.44 U	0.41 U	0.44 U	0.43 U	0.42 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
3-Nitroaniline	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.54 U	0.49 U	0.53 U	0.52 U	0.51 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
4-Chloroaniline	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
4-Nitroaniline	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
4-Nitrophenol	--	--	MG/KG	0.29 U	0.27 U	0.29 U	0.28 U	0.27 U
Acenaphthene	20	100	MG/KG	0.16 U	0.16	0.16 U	0.16 U	0.16 U
Acenaphthylene	100	100	MG/KG	0.16 U	0.36	0.16 U	0.16 U	0.16 U
Acetophenone	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Anthracene	100	100	MG/KG	0.12 U	0.44	0.12 U	0.12 U	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: EP-10	EP-11	EP-12	EP-13	EP-14
				Sample Date: 11/08/2022	11/08/2022	11/08/2022	12/01/2022	11/08/2022
				Sample Depth (ft bls): 14 - 16	15 - 17	14 - 16	14 - 16	14 - 16
				Normal Sample or Field Duplicate: N	N	N	N	N
Benzo(A)Anthracene	1	1	MG/KG	0.12 U	1	0.12 U	0.12 U	0.026 J
Benzo(A)Pyrene	1	1	MG/KG	0.16 U	0.94	0.16 U	0.16 U	0.16 U
Benzo(B)Fluoranthene	1	1	MG/KG	0.12 U	1	0.12 U	0.12 U	0.12 U
Benzo(G,H,I)Perylene	100	100	MG/KG	0.16 U	0.47	0.16 U	0.16 U	0.16 U
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.12 U	0.4	0.12 U	0.12 U	0.12 U
Benzoic Acid	--	--	MG/KG	0.67 U	0.62 U	0.66 U	0.65 U	0.64 U
Benzyl Alcohol	--	--	MG/KG	0.21 U	0.15 J	0.2 U	0.2 U	0.2 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.47 U	0.43 U	0.47 U	0.46 U	0.45 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.22 U	0.2 U	0.22 U	0.22 U	0.21 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.25 U	0.23 U	0.25 U	0.24 U	0.24 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Carbazole	--	--	MG/KG	0.21 U	0.067 J	0.2 U	0.2 U	0.2 U
Chrysene	1	3.9	MG/KG	0.12 U	0.93	0.12 U	0.12 U	0.02 J
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.12 U	0.14	0.12 U	0.12 U	0.12 U
Dibenzofuran	7	59	MG/KG	0.21 U	0.17 J	0.2 U	0.2 U	0.2 U
Diethyl Phthalate	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Dimethyl Phthalate	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Di-N-Octylphthalate	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Fluoranthene	100	100	MG/KG	0.12 U	2	0.12 U	0.12 U	0.048 J
Fluorene	30	100	MG/KG	0.21 U	0.3	0.2 U	0.2 U	0.2 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.12 U	0.11 U	0.12 U	0.12 U	0.12 U
Hexachlorobutadiene	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.59 U	0.54 U	0.59 U	0.57 U	0.56 U
Hexachloroethane	--	--	MG/KG	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.16 U	**0.57**	0.16 U	0.16 U	0.16 U
Isophorone	--	--	MG/KG	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U
M+P MethylPhenol	0.33	100	MG/KG	0.3 U	0.062 J	0.3 U	0.29 U	0.28 U
Naphthalene	12	100	MG/KG	0.21 U	0.19	0.2 U	0.2 U	0.2 U
Nitrobenzene	--	--	MG/KG	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-10	EP-11	EP-12	EP-13	EP-14
			Sample Date:	11/08/2022	11/08/2022	11/08/2022	12/01/2022	11/08/2022
			Sample Depth (ft bls):	14 - 16	15 - 17	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.21 U	0.19 U	0.2 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U
Pentachlorophenol	0.8	6.7	MG/KG	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U
Phenanthrene	100	100	MG/KG	0.12 U	0.73	0.12 U	0.12 U	0.044 J
Phenol	0.33	100	MG/KG	0.21 U	0.033 J	0.2 U	0.2 U	0.2 U
Pyrene	100	100	MG/KG	0.12 U	1.8	0.12 U	0.12 U	0.042 J

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18	EP-19
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.032 U	0.031 U	0.029 U	0.03 U	0.03 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.13 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4-Dichlorophenol	--	--	MG/KG	0.19 U	0.18 U	0.17 U	0.18 U	0.18 U
2,4-Dimethylphenol	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2,4-Dinitrophenol	--	--	MG/KG	1 U	0.99 U	0.93 U	0.94 U	0.96 U
2,4-Dinitrotoluene	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2,6-Dinitrotoluene	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Chloronaphthalene	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Chlorophenol	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Methylnaphthalene	--	--	MG/KG	0.26 U	0.25 U	0.23 U	0.048 J	0.24 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Nitroaniline	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Nitrophenol	--	--	MG/KG	0.46 U	0.44 U	0.42 U	0.42 U	0.43 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
3-Nitroaniline	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.56 U	0.53 U	0.5 U	0.51 U	0.52 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Chloroaniline	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Nitroaniline	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Nitrophenol	--	--	MG/KG	0.3 U	0.29 U	0.27 U	0.28 U	0.28 U
Acenaphthene	20	100	MG/KG	0.17 U	0.17	0.059 J	0.08 J	0.16 U
Acenaphthylene	100	100	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Acetophenone	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Anthracene	100	100	MG/KG	0.13 U	0.12 U	0.12 U	0.039 J	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: EP-15	EP-16	EP-17	EP-18	EP-19
				Sample Date: 10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
				Sample Depth (ft bls): 6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
				Normal Sample or Field Duplicate: N	N	N	N	N
Benzo(A)Anthracene	1	1	MG/KG	0.13 U	0.12 U	0.12 U	0.13	0.12 U
Benzo(A)Pyrene	1	1	MG/KG	0.17 U	0.16 U	0.15 U	0.12 J	0.16 U
Benzo(B)Fluoranthene	1	1	MG/KG	0.13 U	0.12 U	0.12 U	0.14	0.12 U
Benzo(G,H,I)Perylene	100	100	MG/KG	0.17 U	0.16 U	0.15 U	0.063 J	0.16 U
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.13 U	0.12 U	0.12 U	0.052 J	0.12 U
Benzoic Acid	--	--	MG/KG	0.69 U	0.67 U	0.62 U	0.64 U	0.64 U
Benzyl Alcohol	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.49 U	0.47 U	0.44 U	0.45 U	0.45 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.23 U	0.22 U	0.21 U	0.21 U	0.22 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.19 U	0.18 U	0.17 U	0.18 U	0.18 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.26 U	0.25 U	0.23 U	0.24 U	0.24 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Carbazole	--	--	MG/KG	0.21 U	0.023 J	0.19 U	0.029 J	0.2 U
Chrysene	1	3.9	MG/KG	0.13 U	0.12 U	0.12 U	0.12	0.12 U
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.13 U	0.12 U	0.12 U	0.12 U	0.12 U
Dibenzofuran	7	59	MG/KG	0.21 U	0.2 U	0.19 U	0.058 J	0.2 U
Diethyl Phthalate	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Dimethyl Phthalate	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Di-N-Octylphthalate	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Fluoranthene	100	100	MG/KG	0.13 U	0.12 U	0.12 U	0.25	0.12 U
Fluorene	30	100	MG/KG	0.21 U	0.038 J	0.042 J	0.067 J	0.2 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.13 U	0.12 U	0.12 U	0.12 U	0.12 U
Hexachlorobutadiene	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.61 U	0.59 U	0.55 U	0.56 U	0.57 U
Hexachloroethane	--	--	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.17 U	0.16 U	0.15 U	0.074 J	0.16 U
Isophorone	--	--	MG/KG	0.19 U	0.18 U	0.17 U	0.18 U	0.18 U
M+P MethylPhenol	0.33	100	MG/KG	0.066 J	0.3 U	0.28 U	0.28 U	0.29 U
Naphthalene	12	100	MG/KG	0.21 U	0.035 J	0.028 J	0.16 J	0.2 U
Nitrobenzene	--	--	MG/KG	0.19 U	0.18 U	0.17 U	0.18 U	0.18 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18	EP-19
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Pentachlorophenol	0.8	6.7	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Phenanthrene	100	100	MG/KG	0.13 U	0.025 J	0.076 J	0.25	0.12 U
Phenol	0.33	100	MG/KG	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Pyrene	100	100	MG/KG	0.13 U	0.12 U	0.12 U	0.21	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-20	EP-21	EP-22	EP-23	EP-24
			Sample Date:	10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
			Sample Depth (ft bls):	11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.031 U	0.029 U	0.029 U	0.029 U	0.027 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.12 U	0.11 U	0.12 U	0.12 U	0.11 U
2,4-Dichlorophenol	--	--	MG/KG	0.18 U	0.17 U	0.17 U	0.18 U	0.16 U
2,4-Dimethylphenol	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2,4-Dinitrophenol	--	--	MG/KG	0.98 U	0.92 U	0.92 U	0.94 U	0.86 U
2,4-Dinitrotoluene	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2,6-Dinitrotoluene	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2-Chloronaphthalene	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2-Chlorophenol	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2-Methylnaphthalene	--	--	MG/KG	0.1 J	0.051 J	0.2 J	0.15 J	0.22 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2-Nitroaniline	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
2-Nitrophenol	--	--	MG/KG	0.44 U	0.41 U	0.42 U	0.42 U	0.39 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
3-Nitroaniline	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.53 U	0.5 U	0.5 U	0.51 U	0.47 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
4-Chloroaniline	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
4-Nitroaniline	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
4-Nitrophenol	--	--	MG/KG	0.29 U	0.27 U	0.27 U	0.28 U	0.25 U
Acenaphthene	20	100	MG/KG	0.18	0.12 J	0.68	0.76	0.14 U
Acenaphthylene	100	100	MG/KG	0.16 U	0.35	0.24	0.24	0.19
Acetophenone	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Anthracene	100	100	MG/KG	0.43	0.36	0.92	1.8	0.12

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-20	EP-21	EP-22	EP-23	EP-24
			Sample Date:	10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
			Sample Depth (ft bls):	11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.21	**1.2**	**2.8**	**4.2**	0.56
Benzo(A)Pyrene	1	1	MG/KG	0.13 J	**1.2**	**2.9**	**4.2**	**1.4**
Benzo(B)Fluoranthene	1	1	MG/KG	0.16	**1.4**	**3.3**	**5.4**	**1.5**
Benzo(G,H,I)Perylene	100	100	MG/KG	0.057 J	0.66	1.6	2.7	1.1
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.06 J	0.56	**1.1**	0.7	0.39
Benzoic Acid	--	--	MG/KG	0.66 U	0.62 U	0.62 U	0.64 U	0.58 U
Benzyl Alcohol	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.031 J	0.43 U	0.06 J	0.061 J	0.41 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.22 U	0.2 U	0.21 U	0.21 U	0.19 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.18 U	0.17 U	0.17 U	0.18 U	0.16 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.25 U	0.23 U	0.23 U	0.24 U	0.22 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Carbazole	--	--	MG/KG	0.14 J	0.11 J	0.43	0.52	0.061 J
Chrysene	1	3.9	MG/KG	0.18	**1.2**	**3**	**4**	0.6
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.12 U	0.2	**0.45**	**0.74**	0.19
Dibenzofuran	7	59	MG/KG	0.16 J	0.071 J	0.34	0.4	0.017 J
Diethyl Phthalate	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Dimethyl Phthalate	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Di-N-Octylphthalate	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Fluoranthene	100	100	MG/KG	0.83	2.4	6.9	7	0.52
Fluorene	30	100	MG/KG	0.3	0.11 J	0.45	0.63	0.18 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.12 U	0.11 U	0.12 U	0.12 U	0.11 U
Hexachlorobutadiene	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.59 U	0.54 U	0.55 U	0.56 U	0.51 U
Hexachloroethane	--	--	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.14 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.07 J	**0.64**	**1.5**	**2.5**	**1**
Isophorone	--	--	MG/KG	0.18 U	0.17 U	0.17 U	0.18 U	0.16 U
M+P MethylPhenol	0.33	100	MG/KG	0.3 U	0.27 U	0.051 J	0.031 J	0.056 J
Naphthalene	12	100	MG/KG	0.16 J	0.12 J	0.37	0.27	0.078 J
Nitrobenzene	--	--	MG/KG	0.18 U	0.17 U	0.17 U	0.18 U	0.16 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-20	EP-21	EP-22	EP-23	EP-24
			Sample Date:	10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
			Sample Depth (ft bls):	11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.2 U	0.19 U	0.19 U	0.2 U	0.18 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.14 U
Pentachlorophenol	0.8	6.7	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.14 U
Phenanthrene	100	100	MG/KG	1.2	1.2	5.2	7.5	0.095 J
Phenol	0.33	100	MG/KG	0.2 U	0.19 U	0.03 J	0.2 U	0.034 J
Pyrene	100	100	MG/KG	0.57	2.3	5.9	6.2	0.75

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.027 U	0.03 U	0.028 U	0.027 U	0.28 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.11 U	0.12 U	0.11 U	0.11 U	1.1 U
2,4-Dichlorophenol	--	--	MG/KG	0.16 U	0.18 U	0.17 U	0.16 U	1.7 U
2,4-Dimethylphenol	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2,4-Dinitrophenol	--	--	MG/KG	0.88 U	0.97 U	0.91 U	0.87 U	9.1 U
2,4-Dinitrotoluene	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2,6-Dinitrotoluene	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2-Chloronaphthalene	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2-Chlorophenol	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2-Methylnaphthalene	--	--	MG/KG	0.056 J	0.15 J	0.098 J	0.16 J	0.76 J
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.033 J	0.2 U	0.19 U	0.18 U	1.9 U
2-Nitroaniline	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
2-Nitrophenol	--	--	MG/KG	0.39 U	0.44 U	0.41 U	0.39 U	4.1 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
3-Nitroaniline	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.48 U	0.52 U	0.49 U	0.47 U	4.9 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
4-Chloroaniline	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
4-Nitroaniline	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
4-Nitrophenol	--	--	MG/KG	0.26 U	0.28 U	0.27 U	0.25 U	2.6 U
Acenaphthene	20	100	MG/KG	0.026 J	0.46	0.18	0.29	2.2
Acenaphthylene	100	100	MG/KG	0.64	0.15 J	0.16	0.36	0.98 J
Acetophenone	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.035 J	1.9 U
Anthracene	100	100	MG/KG	0.44	1.2	0.57	0.84	6

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
				Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
				Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
				Normal Sample or Field Duplicate:	FD	N	N	N	N
Benzo(A)Anthracene	1	1	MG/KG		**1.2**	**2.4**	**1.4**	**2.4**	**17**
Benzo(A)Pyrene	1	1	MG/KG		**3.4**	**2.4**	**1.4**	**2.4**	**18**
Benzo(B)Fluoranthene	1	1	MG/KG		**3.5**	**2.8**	**1.5**	**2.9**	**20**
Benzo(G,H,I)Perylene	100	100	MG/KG		2.6	1.1	1	1.4	8.9
Benzo(K)Fluoranthene	0.8	3.9	MG/KG		**0.83**	**0.84**	0.51	0.78	**5.6**
Benzoic Acid	--	--	MG/KG		0.59 U	0.65 U	0.62 U	0.58 U	6.2 U
Benzyl Alcohol	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Benzyl Butyl Phthalate	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Biphenyl (Diphenyl)	--	--	MG/KG		0.42 U	0.039 J	0.029 J	0.049 J	0.26 J
Bis(2-Chloroethoxy) Methane	--	--	MG/KG		0.2 U	0.22 U	0.2 U	0.19 U	2 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG		0.16 U	0.18 U	0.17 U	0.16 U	1.7 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG		0.22 U	0.24 U	0.23 U	0.22 U	2.3 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Carbazole	--	--	MG/KG		0.18	0.29	0.13 J	0.31	1.5 J
Chrysene	1	3.9	MG/KG		**1.3**	**2.1**	**1.4**	**2.3**	**17**
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG		**0.42**	**0.34**	0.25	0.33	**2**
Dibenzofuran	7	59	MG/KG		0.061 J	0.38	0.074 J	0.3	1.1 J
Diethyl Phthalate	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Dimethyl Phthalate	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Di-N-Butyl Phthalate	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Di-N-Octylphthalate	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Fluoranthene	100	100	MG/KG		1.1	4.6	3.2	5.1	37
Fluorene	30	100	MG/KG		0.054 J	0.42	0.17 J	0.41	1.7 J
Hexachlorobenzene	0.33	1.2	MG/KG		0.11 U	0.12 U	0.11 U	0.11 U	1.1 U
Hexachlorobutadiene	--	--	MG/KG		0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
Hexachlorocyclopentadiene	--	--	MG/KG		0.52 U	0.58 U	0.54 U	0.52 U	5.4 U
Hexachloroethane	--	--	MG/KG		0.15 U	0.16 U	0.15 U	0.14 U	1.5 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG		**2.4**	**1.4**	**0.9**	**1.6**	**10**
Isophorone	--	--	MG/KG		0.16 U	0.18 U	0.17 U	0.16 U	1.7 U
M+P MethylPhenol	0.33	100	MG/KG		0.17 J	0.29 U	0.27 U	0.037 J	2.7 U
Naphthalene	12	100	MG/KG		0.26	0.14 J	0.15 J	0.31	1 J
Nitrobenzene	--	--	MG/KG		0.16 U	0.18 U	0.17 U	0.16 U	1.7 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.18 U	0.2 U	0.19 U	0.18 U	1.9 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.15 U	0.16 U	0.15 U	0.14 U	1.5 U
Pentachlorophenol	0.8	6.7	MG/KG	0.15 U	0.16 U	0.15 U	0.14 U	1.5 U
Phenanthrene	100	100	MG/KG	0.36	3.6	2.3	3.7	25
Phenol	0.33	100	MG/KG	0.09 J	0.2 U	0.19 U	0.18 U	1.9 U
Pyrene	100	100	MG/KG	1.5	3.9	3.3	4.5	38

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.03 U	0.27 U	0.028 U	0.031 U	0.027 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.12 U	1.1 U	0.11 U	0.12 U	0.11 U
2,4-Dichlorophenol	--	--	MG/KG	0.18 U	1.6 U	0.17 U	0.18 U	0.16 U
2,4-Dimethylphenol	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2,4-Dinitrophenol	--	--	MG/KG	0.96 U	8.8 U	0.9 U	0.98 U	0.87 U
2,4-Dinitrotoluene	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2,6-Dinitrotoluene	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2-Chloronaphthalene	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2-Chlorophenol	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2-Methylnaphthalene	--	--	MG/KG	0.24 U	0.29 J	0.047 J	0.22 J	0.22 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2-Nitroaniline	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
2-Nitrophenol	--	--	MG/KG	0.43 U	4 U	0.4 U	0.44 U	0.39 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
3-Nitroaniline	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.52 U	4.8 U	0.49 U	0.53 U	0.47 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
4-Chloroaniline	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
4-Nitroaniline	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
4-Nitrophenol	--	--	MG/KG	0.28 U	2.6 U	0.26 U	0.29 U	0.25 U
Acenaphthene	20	100	MG/KG	0.03 J	1.1 J	0.18	0.41	0.14 U
Acenaphthylene	100	100	MG/KG	0.052 J	1.5 U	0.1 J	0.2	0.14 U
Acetophenone	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Anthracene	100	100	MG/KG	0.072 J	2.5	0.56	0.83	0.11 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.12 U	**5.4**	**1.2**	**1.5**	0.11 U
Benzo(A)Pyrene	1	1	MG/KG	0.48	**5.3**	1	**1.5**	0.14 U
Benzo(B)Fluoranthene	1	1	MG/KG	0.53	**6.2**	**1.2**	**1.8**	0.11 U
Benzo(G,H,I)Perylene	100	100	MG/KG	0.24	2.8	0.56	0.76	0.14 U
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.2	**2**	0.4	0.54	0.11 U
Benzoic Acid	--	--	MG/KG	0.65 U	5.9 U	0.6 U	0.66 U	0.59 U
Benzyl Alcohol	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.46 U	4.2 U	0.43 U	0.061 J	0.41 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.22 U	2 U	0.2 U	0.22 U	0.2 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.18 U	1.6 U	0.17 U	0.18 U	0.16 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.24 U	2.2 U	0.22 U	0.24 U	0.22 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Carbazole	--	--	MG/KG	0.023 J	1 J	0.16 J	0.3	0.18 U
Chrysene	1	3.9	MG/KG	0.43	**5.4**	**1.1**	**1.6**	0.11 U
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.063 J	**0.75 J**	0.14	0.21	0.11 U
Dibenzofuran	7	59	MG/KG	0.021 J	0.59 J	0.12 J	0.3	0.18 U
Diethyl Phthalate	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Dimethyl Phthalate	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Di-N-Octylphthalate	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Fluoranthene	100	100	MG/KG	0.8	12	2.3	3.1	0.11 U
Fluorene	30	100	MG/KG	0.025 J	0.92 J	0.15 J	0.43	0.18 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.12 U	1.1 U	0.11 U	0.12 U	0.11 U
Hexachlorobutadiene	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.57 U	5.2 U	0.53 U	0.58 U	0.52 U
Hexachloroethane	--	--	MG/KG	0.16 U	1.5 U	0.15 U	0.16 U	0.14 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.28	**3**	**0.63**	**0.82**	0.14 U
Isophorone	--	--	MG/KG	0.18 U	1.6 U	0.17 U	0.18 U	0.16 U
M+P MethylPhenol	0.33	100	MG/KG	0.29 U	2.6 U	0.27 U	0.29 U	0.26 U
Naphthalene	12	100	MG/KG	0.046 J	0.35 J	0.094 J	0.55	0.18 U
Nitrobenzene	--	--	MG/KG	0.18 U	1.6 U	0.17 U	0.18 U	0.16 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.16 U	1.5 U	0.15 U	0.16 U	0.14 U
Pentachlorophenol	0.8	6.7	MG/KG	0.16 U	1.5 U	0.15 U	0.16 U	0.14 U
Phenanthrene	100	100	MG/KG	0.29	10	1.8	3.2	0.11 U
Phenol	0.33	100	MG/KG	0.2 U	1.8 U	0.19 U	0.2 U	0.18 U
Pyrene	100	100	MG/KG	0.77	10	2	2.8	0.11 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.028 U	0.028 U	0.033 U	0.035 U	0.031 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.11 U	0.11 U	0.13 U	0.14 U	0.12 U
2,4-Dichlorophenol	--	--	MG/KG	0.17 U	0.16 U	0.2 U	0.21 U	0.19 U
2,4-Dimethylphenol	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2,4-Dinitrophenol	--	--	MG/KG	0.9 U	0.88 U	1 U	1.1 U	1 U
2,4-Dinitrotoluene	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2,6-Dinitrotoluene	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2-Chloronaphthalene	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2-Chlorophenol	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2-Methylnaphthalene	--	--	MG/KG	0.085 J	0.023 J	0.26 U	0.28 U	1.3
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.035 J
2-Nitroaniline	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
2-Nitrophenol	--	--	MG/KG	0.4 U	0.4 U	0.47 U	0.5 U	0.45 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
3-Nitroaniline	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.48 U	0.48 U	0.57 U	0.6 U	0.54 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
4-Chloroaniline	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
4-Nitroaniline	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
4-Nitrophenol	--	--	MG/KG	0.26 U	0.26 U	0.3 U	0.33 U	0.29 U
Acenaphthene	20	100	MG/KG	0.026 J	0.019 J	0.031 J	0.19 U	1.7
Acenaphthylene	100	100	MG/KG	0.35	0.035 J	0.17 U	0.069 J	1.2
Acetophenone	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.049 J
Anthracene	100	100	MG/KG	0.34	0.049 J	0.13 U	0.052 J	3.9

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	**2.3**	0.091 J	0.099 J	0.13 J	**19**
Benzo(A)Pyrene	1	1	MG/KG	**2**	0.1 J	0.11 J	0.12 J	**18**
Benzo(B)Fluoranthene	1	1	MG/KG	**2.5**	0.11	0.12 J	0.13 J	**20**
Benzo(G,H,I)Perylene	100	100	MG/KG	0.8	0.048 J	0.058 J	0.07 J	10
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.62	0.043 J	0.051 J	0.047 J	**3.6**
Benzoic Acid	--	--	MG/KG	0.6 U	0.6 U	0.71 U	0.75 U	0.68 U
Benzyl Alcohol	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.43 U	0.42 U	0.5 U	0.53 U	0.3 J
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.2 U	0.2 U	0.24 U	0.25 U	0.22 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.17 U	0.16 U	0.2 U	0.21 U	0.19 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.22 U	0.22 U	0.26 U	0.28 U	0.25 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.17 J
Carbazole	--	--	MG/KG	0.058 J	0.18 U	0.22 U	0.028 J	1.1
Chrysene	1	3.9	MG/KG	**1.9**	0.088 J	0.092 J	0.1 J	**17**
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.3	0.11 U	0.13 U	0.14 U	**2.9**
Dibenzofuran	7	59	MG/KG	0.065 J	0.032 J	0.023 J	0.23 U	1.2
Diethyl Phthalate	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Dimethyl Phthalate	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Di-N-Octylphthalate	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Fluoranthene	100	100	MG/KG	3.1	0.18	0.18	0.2	30
Fluorene	30	100	MG/KG	0.074 J	0.047 J	0.032 J	0.026 J	1.4
Hexachlorobenzene	0.33	1.2	MG/KG	0.11 U	0.11 U	0.13 U	0.14 U	0.12 U
Hexachlorobutadiene	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.53 U	0.53 U	0.62 U	0.67 U	0.6 U
Hexachloroethane	--	--	MG/KG	0.15 U	0.15 U	0.17 U	0.19 U	0.17 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	**1**	0.058 J	0.063 J	0.061 J	**8.2**
Isophorone	--	--	MG/KG	0.17 U	0.16 U	0.2 U	0.21 U	0.19 U
M+P MethylPhenol	0.33	100	MG/KG	0.081 J	0.26 U	0.31 U	0.34 U	0.13 J
Naphthalene	12	100	MG/KG	0.26	0.067 J	0.036 J	0.23 U	4.7
Nitrobenzene	--	--	MG/KG	0.17 U	0.16 U	0.2 U	0.21 U	0.19 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.19 U	0.18 U	0.22 U	0.23 U	0.21 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.15 U	0.15 U	0.17 U	0.19 U	0.17 U
Pentachlorophenol	0.8	6.7	MG/KG	0.15 U	0.15 U	0.17 U	0.19 U	0.17 U
Phenanthrene	100	100	MG/KG	0.61	0.14	0.14	0.13 J	15
Phenol	0.33	100	MG/KG	0.059 J	0.18 U	0.22 U	0.23 U	0.069 J
Pyrene	100	100	MG/KG	3.1	0.15	0.16	0.2	35

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: SW-8	SW-9	SW-10	SW-10	SW-11
				Sample Date: 12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
				Sample Depth (ft bls): 6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
				Normal Sample or Field Duplicate: N	N	N	FD	N
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.028 U	0.03 U	0.029 U	0.03 U	0.03 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4-Dichlorophenol	--	--	MG/KG	0.16 U	0.18 U	0.18 U	0.18 U	0.18 U
2,4-Dimethylphenol	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-Dinitrophenol	--	--	MG/KG	0.88 U	0.96 U	0.94 U	0.95 U	0.96 U
2,4-Dinitrotoluene	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-Dinitrotoluene	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloronaphthalene	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chlorophenol	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Methylnaphthalene	--	--	MG/KG	0.22 U	0.24 U	0.048 J	0.11 J	0.24 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Nitroaniline	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Nitrophenol	--	--	MG/KG	0.4 U	0.43 U	0.42 U	0.43 U	0.43 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
3-Nitroaniline	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.48 U	0.52 U	0.51 U	0.51 U	0.52 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Chloroaniline	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Nitroaniline	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Nitrophenol	--	--	MG/KG	0.26 U	0.28 U	0.27 U	0.28 U	0.28 U
Acenaphthene	20	100	MG/KG	0.15 U	0.16 U	0.076 J	0.36	0.16 U
Acenaphthylene	100	100	MG/KG	0.15 U	0.16 U	0.05 J	0.4	0.16 U
Acetophenone	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Anthracene	100	100	MG/KG	0.11 U	0.073 J	0.11 J	1.6	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.11 U	0.17	0.22	**4.4**	0.12 U
Benzo(A)Pyrene	1	1	MG/KG	0.15 U	0.17	0.2	**4.5**	0.16 U
Benzo(B)Fluoranthene	1	1	MG/KG	0.11 U	0.19	0.24	**5.9**	0.12 U
Benzo(G,H,I)Perylene	100	100	MG/KG	0.15 U	0.091 J	0.1 J	2.6	0.16 U
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.11 U	0.054 J	0.065 J	**1.1**	0.12 U
Benzoic Acid	--	--	MG/KG	0.59 U	0.65 U	0.63 U	0.64 U	0.65 U
Benzyl Alcohol	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.42 U	0.46 U	0.44 U	0.03 J	0.46 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.2 U	0.22 U	0.21 U	0.21 U	0.22 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.16 U	0.18 U	0.18 U	0.18 U	0.18 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.22 U	0.24 U	0.23 U	0.24 U	0.24 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbazole	--	--	MG/KG	0.18 U	0.2 U	0.039 J	0.32	0.2 U
Chrysene	1	3.9	MG/KG	0.11 U	0.16	0.18	**4.2**	0.12 U
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.11 U	0.12 U	0.027 J	**0.66**	0.12 U
Dibenzofuran	7	59	MG/KG	0.18 U	0.022 J	0.06 J	0.35	0.2 U
Diethyl Phthalate	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Dimethyl Phthalate	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Di-N-Octylphthalate	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Fluoranthene	100	100	MG/KG	0.11 U	0.38	0.45	12	0.12 U
Fluorene	30	100	MG/KG	0.18 U	0.028 J	0.077 J	0.38	0.2 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U
Hexachlorobutadiene	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.52 U	0.57 U	0.56 U	0.56 U	0.57 U
Hexachloroethane	--	--	MG/KG	0.15 U	0.16 U	0.16 U	0.16 U	0.16 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.15 U	0.098 J	0.12 J	**3**	0.16 U
Isophorone	--	--	MG/KG	0.16 U	0.18 U	0.18 U	0.18 U	0.18 U
M+P MethylPhenol	0.33	100	MG/KG	0.26 U	0.29 U	0.28 U	0.28 U	0.29 U
Naphthalene	12	100	MG/KG	0.041 J	0.2 U	0.083 J	0.24	0.044 J
Nitrobenzene	--	--	MG/KG	0.16 U	0.18 U	0.18 U	0.18 U	0.18 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.15 U	0.16 U	0.16 U	0.16 U	0.16 U
Pentachlorophenol	0.8	6.7	MG/KG	0.15 U	0.16 U	0.16 U	0.16 U	0.16 U
Phenanthrene	100	100	MG/KG	0.11 U	0.25	0.39	6.2	0.12 U
Phenol	0.33	100	MG/KG	0.18 U	0.2 U	0.2 U	0.2 U	0.2 U
Pyrene	100	100	MG/KG	0.11 U	0.34	0.41	10	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-12	SW-13	SW-14	SW-14	SW-15
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.033 U	0.03 U	0.028 U	0.03 U	0.029 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.13 U	0.12 U	0.11 U	0.12 U	0.12 U
2,4-Dichlorophenol	--	--	MG/KG	0.2 U	0.18 U	0.17 U	0.18 U	0.18 U
2,4-Dimethylphenol	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2,4-Dinitrophenol	--	--	MG/KG	1 U	0.97 U	0.9 U	0.96 U	0.94 U
2,4-Dinitrotoluene	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2,6-Dinitrotoluene	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Chloronaphthalene	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Chlorophenol	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Methylnaphthalene	--	--	MG/KG	0.26 U	0.24 U	3.7	0.24 U	0.23 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Nitroaniline	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Nitrophenol	--	--	MG/KG	0.47 U	0.44 U	0.4 U	0.43 U	0.42 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
3-Nitroaniline	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.56 U	0.52 U	0.49 U	0.52 U	0.51 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Chloroaniline	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Nitroaniline	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
4-Nitrophenol	--	--	MG/KG	0.3 U	0.28 U	0.26 U	0.28 U	0.27 U
Acenaphthene	20	100	MG/KG	0.028 J	0.16 U	4.5	0.023 J	0.16 U
Acenaphthylene	100	100	MG/KG	0.17 U	0.16 U	0.22	0.16 U	0.16 U
Acetophenone	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Anthracene	100	100	MG/KG	0.13 U	0.12 U	2.3	0.12 U	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Residential SCO	Units	Sample Designation: SW-12	SW-13	SW-14	SW-14	SW-15
				Sample Date: 12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
				Sample Depth (ft bls): 15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
				Normal Sample or Field Duplicate: N	N	N	N	N
Benzo(A)Anthracene	1	1	MG/KG	0.13 U	0.12 U	**1.5**	0.024 J	0.12 U
Benzo(A)Pyrene	1	1	MG/KG	0.17 U	0.16 U	0.96	0.16 U	0.16 U
Benzo(B)Fluoranthene	1	1	MG/KG	0.13 U	0.12 U	**1.1**	0.12 U	0.12 U
Benzo(G,H,I)Perylene	100	100	MG/KG	0.17 U	0.16 U	0.4	0.16 U	0.16 U
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.13 U	0.12 U	0.37	0.12 U	0.12 U
Benzoic Acid	--	--	MG/KG	0.7 U	0.65 U	0.61 U	0.65 U	0.63 U
Benzyl Alcohol	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.5 U	0.46 U	0.88	0.46 U	0.45 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.23 U	0.22 U	0.2 U	0.22 U	0.21 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.2 U	0.18 U	0.17 U	0.18 U	0.18 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.26 U	0.24 U	0.22 U	0.24 U	0.23 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Carbazole	--	--	MG/KG	0.22 U	0.2 U	1.3	0.2 U	0.2 U
Chrysene	1	3.9	MG/KG	0.13 U	0.12 U	**1.2**	0.022 J	0.12 U
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.13 U	0.12 U	0.11	0.12 U	0.12 U
Dibenzofuran	7	59	MG/KG	0.22 U	0.2 U	3.5	0.2 U	0.2 U
Diethyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Dimethyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Di-N-Octylphthalate	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Fluoranthene	100	100	MG/KG	0.13 U	0.12 U	5.9	0.052 J	0.035 J
Fluorene	30	100	MG/KG	0.22 U	0.2 U	4	0.2 U	0.2 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.13 U	0.12 U	0.11 U	0.12 U	0.12 U
Hexachlorobutadiene	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.62 U	0.58 U	0.54 U	0.57 U	0.56 U
Hexachloroethane	--	--	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.17 U	0.16 U	0.47	0.16 U	0.16 U
Isophorone	--	--	MG/KG	0.2 U	0.18 U	0.17 U	0.18 U	0.18 U
M+P MethylPhenol	0.33	100	MG/KG	0.31 U	0.29 U	0.053 J	0.29 U	0.28 U
Naphthalene	12	100	MG/KG	0.22 U	0.2 U	**14**	0.2 U	0.024 J
Nitrobenzene	--	--	MG/KG	0.2 U	0.18 U	0.17 U	0.18 U	0.18 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-12	SW-13	SW-14	SW-14	SW-15
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Pentachlorophenol	0.8	6.7	MG/KG	0.17 U	0.16 U	0.15 U	0.16 U	0.16 U
Phenanthrene	100	100	MG/KG	0.13 U	0.12 U	14	0.055 J	0.043 J
Phenol	0.33	100	MG/KG	0.22 U	0.2 U	0.19 U	0.2 U	0.2 U
Pyrene	100	100	MG/KG	0.13 U	0.12 U	4.3	0.043 J	0.028 J

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.029 U	0.031 U	0.029 U	0.03 U	0.032 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.13 U
2,4-Dichlorophenol	--	--	MG/KG	0.17 U	0.19 U	0.18 U	0.18 U	0.19 U
2,4-Dimethylphenol	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2,4-Dinitrophenol	--	--	MG/KG	0.93 U	1 U	0.94 U	0.97 U	1 U
2,4-Dinitrotoluene	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2,6-Dinitrotoluene	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2-Chloronaphthalene	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2-Chlorophenol	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2-Methylnaphthalene	--	--	MG/KG	0.23 U	0.25 U	0.24 U	0.24 U	0.69
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2-Nitroaniline	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
2-Nitrophenol	--	--	MG/KG	0.42 U	0.45 U	0.42 U	0.44 U	0.46 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
3-Nitroaniline	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.5 U	0.54 U	0.51 U	0.53 U	0.55 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
4-Chloroaniline	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
4-Nitroaniline	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
4-Nitrophenol	--	--	MG/KG	0.27 U	0.29 U	0.27 U	0.28 U	0.3 U
Acenaphthene	20	100	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.22
Acenaphthylene	100	100	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.49
Acetophenone	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Anthracene	100	100	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.71

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.65
Benzo(A)Pyrene	1	1	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.46
Benzo(B)Fluoranthene	1	1	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.49
Benzo(G,H,I)Perylene	100	100	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.16 J
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.18
Benzoic Acid	--	--	MG/KG	0.63 U	0.68 U	0.64 U	0.66 U	0.68 U
Benzyl Alcohol	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.44 U	0.48 U	0.45 U	0.46 U	0.11 J
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.21 U	0.22 U	0.21 U	0.22 U	0.23 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.17 U	0.19 U	0.18 U	0.18 U	0.19 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.23 U	0.25 U	0.24 U	0.24 U	0.25 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Carbazole	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.13 J
Chrysene	1	3.9	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.58
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.051 J
Dibenzofuran	7	59	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.54
Diethyl Phthalate	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Dimethyl Phthalate	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Di-N-Octylphthalate	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Fluoranthene	100	100	MG/KG	0.12 U	0.12 U	0.12 U	0.036 J	1.5
Fluorene	30	100	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.89
Hexachlorobenzene	0.33	1.2	MG/KG	0.12 U	0.12 U	0.12 U	0.12 U	0.13 U
Hexachlorobutadiene	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.55 U	0.6 U	0.56 U	0.58 U	0.6 U
Hexachloroethane	--	--	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.17 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.19
Isophorone	--	--	MG/KG	0.17 U	0.19 U	0.18 U	0.18 U	0.19 U
M+P MethylPhenol	0.33	100	MG/KG	0.28 U	0.3 U	0.28 U	0.29 U	0.3 U
Naphthalene	12	100	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	1.3
Nitrobenzene	--	--	MG/KG	0.17 U	0.19 U	0.18 U	0.18 U	0.19 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.17 U
Pentachlorophenol	0.8	6.7	MG/KG	0.15 U	0.17 U	0.16 U	0.16 U	0.17 U
Phenanthrene	100	100	MG/KG	0.12 U	0.12 U	0.12 U	0.039 J	1.9
Phenol	0.33	100	MG/KG	0.19 U	0.21 U	0.2 U	0.2 U	0.21 U
Pyrene	100	100	MG/KG	0.12 U	0.12 U	0.12 U	0.034 J	1.3

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
1,2,4,5-Tetrachlorobenzene	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
1,2-Dichlorobenzene	1.1	100	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
1,3-Dichlorobenzene	2.4	49	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
1,4-Dichlorobenzene	1.8	13	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
1,4-Dioxane (P-Dioxane)	0.1	13	MG/KG	0.03 U	0.028 U	0.027 U	0.03 U	0.03 U
2,4,5-Trichlorophenol	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2,4,6-Trichlorophenol	--	--	MG/KG	0.12 U	0.11 U	0.11 U	0.12 U	0.12 U
2,4-Dichlorophenol	--	--	MG/KG	0.18 U	0.17 U	0.16 U	0.18 U	0.18 U
2,4-Dimethylphenol	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2,4-Dinitrophenol	--	--	MG/KG	0.96 U	0.89 U	0.88 U	0.95 U	0.94 U
2,4-Dinitrotoluene	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2,6-Dinitrotoluene	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2-Chloronaphthalene	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2-Chlorophenol	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2-Methylnaphthalene	--	--	MG/KG	0.24 U	0.22 U	0.22 U	0.24 U	0.24 U
2-Methylphenol (O-Cresol)	0.33	100	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2-Nitroaniline	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
2-Nitrophenol	--	--	MG/KG	0.43 U	0.4 U	0.4 U	0.42 U	0.42 U
3,3'-Dichlorobenzidine	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
3-Nitroaniline	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
4,6-Dinitro-2-Methylphenol	--	--	MG/KG	0.52 U	0.48 U	0.48 U	0.51 U	0.51 U
4-Bromophenyl Phenyl Ether	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
4-Chloro-3-Methylphenol	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
4-Chloroaniline	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
4-Chlorophenyl Phenyl Ether	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
4-Nitroaniline	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
4-Nitrophenol	--	--	MG/KG	0.28 U	0.26 U	0.26 U	0.28 U	0.28 U
Acenaphthene	20	100	MG/KG	0.16 U	0.15 U	0.15 U	0.081 J	0.16 U
Acenaphthylene	100	100	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.16 U
Acetophenone	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Anthracene	100	100	MG/KG	0.12 U	0.11 U	0.11 U	0.13	0.12 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
Benzo(A)Anthracene	1	1	MG/KG	0.041 J	0.11 U	0.038 J	0.13	0.12 U
Benzo(A)Pyrene	1	1	MG/KG	0.16 U	0.15 U	0.15 U	0.075 J	0.16 U
Benzo(B)Fluoranthene	1	1	MG/KG	0.037 J	0.11 U	0.034 J	0.085 J	0.12 U
Benzo(G,H,I)Perylene	100	100	MG/KG	0.16 U	0.15 U	0.15 U	0.023 J	0.16 U
Benzo(K)Fluoranthene	0.8	3.9	MG/KG	0.12 U	0.11 U	0.11 U	0.033 J	0.12 U
Benzoic Acid	--	--	MG/KG	0.64 U	0.6 U	0.59 U	0.64 U	0.64 U
Benzyl Alcohol	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Benzyl Butyl Phthalate	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Biphenyl (Diphenyl)	--	--	MG/KG	0.45 U	0.42 U	0.42 U	0.45 U	0.45 U
Bis(2-Chloroethoxy) Methane	--	--	MG/KG	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	--	--	MG/KG	0.18 U	0.17 U	0.16 U	0.18 U	0.18 U
Bis(2-Chloroisopropyl) Ether	--	--	MG/KG	0.24 U	0.22 U	0.22 U	0.24 U	0.24 U
Bis(2-Ethylhexyl) Phthalate	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Carbazole	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Chrysene	1	3.9	MG/KG	0.031 J	0.11 U	0.032 J	0.1 J	0.12 U
Dibenz(A,H)Anthracene	0.33	0.33	MG/KG	0.12 U	0.11 U	0.11 U	0.12 U	0.12 U
Dibenzofuran	7	59	MG/KG	0.027 J	0.18 U	0.022 J	0.1 J	0.2 U
Diethyl Phthalate	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Dimethyl Phthalate	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Di-N-Butyl Phthalate	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Di-N-Octylphthalate	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Fluoranthene	100	100	MG/KG	0.074 J	0.11 U	0.073 J	0.3	0.12 U
Fluorene	30	100	MG/KG	0.043 J	0.18 U	0.035 J	0.17 J	0.2 U
Hexachlorobenzene	0.33	1.2	MG/KG	0.12 U	0.11 U	0.11 U	0.12 U	0.12 U
Hexachlorobutadiene	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Hexachlorocyclopentadiene	--	--	MG/KG	0.57 U	0.53 U	0.52 U	0.56 U	0.56 U
Hexachloroethane	--	--	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.16 U
Indeno(1,2,3-C,D)Pyrene	0.5	0.5	MG/KG	0.16 U	0.15 U	0.15 U	0.031 J	0.16 U
Isophorone	--	--	MG/KG	0.18 U	0.17 U	0.16 U	0.18 U	0.18 U
M+P MethylPhenol	0.33	100	MG/KG	0.29 U	0.27 U	0.26 U	0.28 U	0.28 U
Naphthalene	12	100	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Nitrobenzene	--	--	MG/KG	0.18 U	0.17 U	0.16 U	0.18 U	0.18 U

Table 3b. Summary of Semivolatile Organic Compounds in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
N-Nitrosodi-N-Propylamine	--	--	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
N-Nitrosodiphenylamine	--	--	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.16 U
Pentachlorophenol	0.8	6.7	MG/KG	0.16 U	0.15 U	0.15 U	0.16 U	0.16 U
Phenanthrene	100	100	MG/KG	0.11 J	0.11 U	0.092 J	0.37	0.12 U
Phenol	0.33	100	MG/KG	0.2 U	0.18 U	0.18 U	0.2 U	0.2 U
Pyrene	100	100	MG/KG	0.059 J	0.11 U	0.059 J	0.26	0.12 U

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5	EP-6
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022	11/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	4370	4140	6130	6860	4810	4220
Antimony	--	--	MG/KG	4.94 U	4.79 U	4.97 U	0.88 J	4.22 U	4.12 U
Arsenic	13	16	MG/KG	1.83	2.6	3.57	2.63	0.654 J	1.17
Barium	350	400	MG/KG	5.86	6.74	8.64	10.7	14.9	16.3
Beryllium	7.2	72	MG/KG	0.085 J	0.242 J	0.221 J	0.267 J	0.282 J	0.242 J
Cadmium	2.5	4.3	MG/KG	0.988 U	0.958 U	0.995 U	1 U	0.092 J	0.095 J
Calcium	--	--	MG/KG	494	788	1160	3780	466	1110
Chromium, Hexavalent	1	110	MG/KG	0.787 J	0.988 UJ	1.02 U	1.02 UJ	0.293 J	0.858 U
Chromium, Total	30	180	MG/KG	8.31	7.76	11.1	18.3	10.2	26
Cobalt	--	--	MG/KG	1.91 J	3.03	3.61	6.08	5.06	4.02
Copper	50	270	MG/KG	1.78	3.84	4.96	12.4	8.16	8.4
Cyanide	27	27	MG/KG	1.2 UJ	0.54 J	1.2 UJ	0.35 J-	0.99 UJ	1 U
Iron	--	--	MG/KG	11400	10100	10200	15800	11600	12400
Lead	63	400	MG/KG	2.92 J	4.75 J	4.96 J	7.7	4.28	4.73
Magnesium	--	--	MG/KG	1180	1790	1720	2510	2140	2010
Manganese	1600	2000	MG/KG	89.9 J	109	82.5	133	170	325
Mercury	0.18	0.81	MG/KG	0.108 U	0.078 U	0.086 U	0.08 U	0.075 U	0.149
Nickel	30	310	MG/KG	5.2	7.2	11.2	11.9	10.5	10.2
Potassium	--	--	MG/KG	383	520	460	788	388	520
Selenium	3.9	180	MG/KG	0.405 J	1.92 U	0.362 J	2.01 U	1.69 U	1.65 U
Silver	2	180	MG/KG	0.494 U	0.479 U	0.497 U	0.502 U	0.422 U	0.412 U
Sodium	--	--	MG/KG	197 J	154 J	208	73 J	47.2 J	39.2 J
Thallium	--	--	MG/KG	1.98 U	1.92 U	1.99 U	2.01 U	1.69 U	1.65 U
Vanadium	--	--	MG/KG	10	11.5	15.2	15.9	12.9	10.4
Zinc	109	10000	MG/KG	10.4	20.5	21.4	28.3	23.2	24.1

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-7	EP-8	EP-9	EP-9	EP-10	EP-11
			Sample Date:	12/01/2022	10/20/2022	12/01/2022	12/01/2022	11/08/2022	10/20/2022
			Sample Depth (ft bls):	8 - 10	10 - 12	11 - 13	11 - 13	14 - 16	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	FD	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	5970	8390	1870	1840	6810	8270
Antimony	--	--	MG/KG	4.36 U	4.66 U	4.53 U	4.68 U	4.81 U	4.63 U
Arsenic	13	16	MG/KG	2.42	1.95	0.461 J	0.58 J	8	3.72
Barium	350	400	MG/KG	18.3	8.7	8.2	7.73	47.7	53.8
Beryllium	7.2	72	MG/KG	0.386 J	0.432 J	0.055 J	0.036 J	0.444 J	0.397 J
Cadmium	2.5	4.3	MG/KG	0.131 J	0.931 U	0.907 U	0.937 U	0.963 U	0.193 J
Calcium	--	--	MG/KG	792	901	413	498	471	3640
Chromium, Hexavalent	1	110	MG/KG	0.905 U	0.247 J-	0.938 U	0.948 U	1.02 U	0.948 U
Chromium, Total	30	180	MG/KG	14.6	12.4	2.19	2.24	10.9	13.3
Cobalt	--	--	MG/KG	7.93	4.58	0.446 J	0.48 J	9.01	4.93
Copper	50	270	MG/KG	10.5	11.3	1.46	3.16	21.6	26.1
Cyanide	27	27	MG/KG	1.1 UJ	1.1 UJ	1.1 UJ	0.58 J	1.2 U	0.38 J
Iron	--	--	MG/KG	14800	13000	1100	1170	45400	13400
Lead	63	400	MG/KG	16.1	6.74	46.3	9.15	10.6	**94.9**
Magnesium	--	--	MG/KG	2620	2750	434	449	2370	2740
Manganese	1600	2000	MG/KG	123	94.5	19.4	20.3	203	277
Mercury	0.18	0.81	MG/KG	0.076	0.085 U	0.052 J	0.076 U	0.08 U	**0.437**
Nickel	30	310	MG/KG	13.8	16	1.41 J	1.3 J	23.9	13.7
Potassium	--	--	MG/KG	567	547	328	326	471	697
Selenium	3.9	180	MG/KG	1.74 U	1.86 U	1.81 U	1.87 U	1.92 U	1.85 U
Silver	2	180	MG/KG	0.436 U	0.466 U	0.453 U	0.468 U	1.36	0.3 J
Sodium	--	--	MG/KG	100 J	96 J	135 J	178 J	147 J	174 J
Thallium	--	--	MG/KG	1.74 U	1.86 U	1.81 U	1.87 U	1.92 U	1.85 U
Vanadium	--	--	MG/KG	16.9	14.9	1.89	1.93	14.5	16
Zinc	109	10000	MG/KG	30.4	30.2	17.9	8.93	50.6	74.6

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-11	EP-12	EP-13	EP-14	EP-15	EP-16
			Sample Date:	11/08/2022	11/08/2022	12/01/2022	11/08/2022	10/07/2022	10/07/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16	6 - 8	9 - 11
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	NA	7210	7380	2920	6700	6070
Antimony	--	--	MG/KG	NA	4.72 U	4.72 U	4.62 U	4.92 U	4.8 U
Arsenic	13	16	MG/KG	NA	6.16	1.37	1.87	3.71	2
Barium	350	400	MG/KG	NA	25.2	20.4	13.4	13.5	25.9
Beryllium	7.2	72	MG/KG	NA	0.239 J	0.529	0.273 J	0.294 J	0.261 J
Cadmium	2.5	4.3	MG/KG	NA	0.944 U	0.943 U	0.923 U	0.158 J	0.197 J
Calcium	--	--	MG/KG	NA	707	684 J	690	631	1310
Chromium, Hexavalent	1	110	MG/KG	NA	1 U	0.973 UJ	0.96 U	1.03 U	1 U
Chromium, Total	30	180	MG/KG	NA	10.7	10.4	7.52	9.82	9.86
Cobalt	--	--	MG/KG	NA	6.13	3.62	5.33	3.71	5.56
Copper	50	270	MG/KG	NA	13.6	3.84	6.91	4.72	12.6
Cyanide	27	27	MG/KG	NA	1.2 U	1.1 U	1.2 U	1.2 UJ	1.2 UJ
Iron	--	--	MG/KG	NA	12500	11100	8120	14100	14300
Lead	63	400	MG/KG	34.6	7.25	5.34	13.4	6.69	5.59
Magnesium	--	--	MG/KG	NA	2780	2420	1260	1710	2500
Manganese	1600	2000	MG/KG	NA	80.4	78.3	65.3	187	313
Mercury	0.18	0.81	MG/KG	0.079	0.079 U	0.076 U	0.066 J	0.081 U	0.091 U
Nickel	30	310	MG/KG	NA	15.3	12	9.6	8.94	15.2
Potassium	--	--	MG/KG	NA	519	672	465	505	709
Selenium	3.9	180	MG/KG	NA	1.89 U	1.89 U	1.85 U	1.97 U	1.92 U
Silver	2	180	MG/KG	NA	0.318 J	0.472 U	0.462 U	0.983 U	0.959 U
Sodium	--	--	MG/KG	NA	152 J	196	89.8 J	200	151 J
Thallium	--	--	MG/KG	NA	1.89 U	0.442 J	1.85 U	1.97 U	1.92 U
Vanadium	--	--	MG/KG	NA	11.5	13.1	13.9	15.7	13.8
Zinc	109	10000	MG/KG	NA	47.5	26.5	34.3	23.7	36.9

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-17	EP-18	EP-19	EP-20	EP-20	EP-21
			Sample Date:	10/07/2022	12/08/2022	10/07/2022	10/07/2022	10/25/2022	01/26/2023
			Sample Depth (ft bls):	9 - 11	13 - 15	8 - 10	11 - 13	11 - 13	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	6220	2920	7370	NA	7410	6340
Antimony	--	--	MG/KG	4.58 U	4.63 U	4.7 U	NA	4.87 U	0.766 J
Arsenic	13	16	MG/KG	2.49	1.08	1.91	NA	2.49	5.05
Barium	350	400	MG/KG	10.5	12.6	8.78	NA	20.8	73.8
Beryllium	7.2	72	MG/KG	0.355 J	0.11 J	0.276 J	NA	0.368 J	0.381 J
Cadmium	2.5	4.3	MG/KG	0.917 U	0.926 U	0.13 J	NA	0.975 U	0.604 J
Calcium	--	--	MG/KG	312	239 J	552	NA	1280	3820
Chromium, Hexavalent	1	110	MG/KG	0.952 UJ	0.973 U	0.962 U	NA	0.992 U	0.931 U
Chromium, Total	30	180	MG/KG	12.1	3.7	9.99	NA	12.3	15.6
Cobalt	--	--	MG/KG	4.94	1.14 J	3.02	NA	4.55	5.59
Copper	50	270	MG/KG	5.72	0.928 J	7	NA	10.8	47.7
Cyanide	27	27	MG/KG	1.1 UJ	1.2 UJ	0.69 UJ	NA	1.2 UJ	1.1 UJ
Iron	--	--	MG/KG	11200	5260	13500	NA	13300	14500
Lead	63	400	MG/KG	6.24	4.92 J	4.23 J	6.72	16.1	**392**
Magnesium	--	--	MG/KG	2300	877	1720	NA	2620	2680
Manganese	1600	2000	MG/KG	66.7	40	63	NA	113	693
Mercury	0.18	0.81	MG/KG	0.087 U	0.087 U	0.086 U	NA	0.069 J	**6.27**
Nickel	30	310	MG/KG	10.7	2.99	10	NA	12.6	11.6
Potassium	--	--	MG/KG	289	280	420	NA	462	726
Selenium	3.9	180	MG/KG	1.83 U	1.85 U	1.88 U	NA	1.95 U	1.75 U
Silver	2	180	MG/KG	0.917 U	0.463 U	0.939 U	NA	0.487 U	0.437 U
Sodium	--	--	MG/KG	72.3 J	137 J	163 J	NA	65.5 J	79.7 J
Thallium	--	--	MG/KG	1.83 U	1.85 U	1.88 U	NA	1.95 U	0.563 J
Vanadium	--	--	MG/KG	14.3	3.54	13.3	NA	13.4	15.6
Zinc	109	10000	MG/KG	23.4	9.5 J	23.7	NA	34.4	91.2

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-22	EP-23	EP-24	EP-24	EP-25	EP-26
			Sample Date:	01/26/2023	01/26/2023	02/06/2023	02/06/2023	01/31/2023	01/26/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	FD	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	6910	5180	6510	6760	5960	6410
Antimony	--	--	MG/KG	1.3 J	1.45 J	0.92 J	0.651 J	1.34 J	0.703 J
Arsenic	13	16	MG/KG	7.98	**20.4**	2.41	3.04	5.67	4.45
Barium	350	400	MG/KG	99.2	156	25.5	29.6	244	107
Beryllium	7.2	72	MG/KG	0.46	0.451 J	0.316 J	0.336 J	0.257 J	0.325 J
Cadmium	2.5	4.3	MG/KG	0.857 J	0.331 J	0.848 U	0.888 U	1.19	0.266 J
Calcium	--	--	MG/KG	3260	8840	890 J	2380 J	6260	6710
Chromium, Hexavalent	1	110	MG/KG	0.929 U	0.367 J	0.307 J	0.423 J	**1.14**	**1.13**
Chromium, Total	30	180	MG/KG	17.8	13.4	9.7	10.8	18.6	14.1
Cobalt	--	--	MG/KG	5.79	8.68	5.13	5.42	5.98	6.74
Copper	50	270	MG/KG	**83.9**	**479**	10.7	15.1	34.8	49
Cyanide	27	27	MG/KG	0.4 J-	0.86 J-	1 UJ	1.1 UJ	1.3 J-	4.3 J-
Iron	--	--	MG/KG	18400	22900	13400	14800	15600	14800
Lead	63	400	MG/KG	**441**	**634**	11.9 J	**70.2 J**	**290**	**230**
Magnesium	--	--	MG/KG	2440	1960	2480	2630	2740	2440
Manganese	1600	2000	MG/KG	496	**2480**	372	404	466	362
Mercury	0.18	0.81	MG/KG	**1.19**	**1.66**	0.081 U	0.079 U	**4.98**	**5.08**
Nickel	30	310	MG/KG	13	16.4	13.1	14.3	13	11.6
Potassium	--	--	MG/KG	695	774	543	589	728	682
Selenium	3.9	180	MG/KG	0.299 J	1.82 U	1.7 U	1.78 U	1.06 J	1.78 U
Silver	2	180	MG/KG	0.456 U	0.454 U	0.424 U	0.444 U	0.469 U	0.446 U
Sodium	--	--	MG/KG	87.8 J	176 J	77.4 J	91.6 J	96.4 J	203
Thallium	--	--	MG/KG	0.575 J	1.1 J	1.7 U	1.78 U	1.87 U	0.349 J
Vanadium	--	--	MG/KG	17.5	36.4	13.8	15.1	15.3	15.1
Zinc	109	10000	MG/KG	**200**	**247**	29.9 J	65.2 J	**371**	**132**

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-27	EP-28	EP-29	EP-30	EP-31	SW-1
			Sample Date:	02/06/2023	01/31/2023	01/31/2023	01/31/2023	01/31/2023	03/28/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4	7.5 - 9.5
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	6170	5400	5930	4440	5090	5460
Antimony	--	--	MG/KG	1.51 J	3.54 J	1.17 J	1.41 J	2.26 J	0.367 J
Arsenic	13	16	MG/KG	4.92	11.1	4.19	7.46	12.1 J	2.8
Barium	350	400	MG/KG	167	262	50.8	145	163	28.8
Beryllium	7.2	72	MG/KG	0.301 J	0.199 J	0.245 J	0.185 J	0.145 J	0.305 J
Cadmium	2.5	4.3	MG/KG	0.241 J	1.03	0.158 J	0.323 J	0.215 J	0.96 U
Calcium	--	--	MG/KG	9010	15700	4190	18100	28500	1070
Chromium, Hexavalent	1	110	MG/KG	0.396 J-	0.55 J	0.257 J	0.394 J	0.553 J	0.29 J-
Chromium, Total	30	180	MG/KG	14.6	15.8	11	12.1	9.94	10.4
Cobalt	--	--	MG/KG	5.41	6.89	5.2	4.94	5.08	4.83
Copper	50	270	MG/KG	**65.6 J**	**142**	38.3	**81.2**	**75.6 J**	11.7
Cyanide	27	27	MG/KG	1 UJ	0.49 J-	1.2 UJ	0.35 J-	0.95 J-	1.2 UJ
Iron	--	--	MG/KG	17300	20800	13000	10400	14000	13100
Lead	63	400	MG/KG	**294**	**977**	**126**	**310**	**358**	19.2
Magnesium	--	--	MG/KG	2980	2860	2480	2220	3770	2460
Manganese	1600	2000	MG/KG	422	570	331	304	420 J	122
Mercury	0.18	0.81	MG/KG	**11**	**1.28**	0.118	**0.288**	**0.45**	0.081 U
Nickel	30	310	MG/KG	12	15.5	12.1	9.56	9.79	12.2
Potassium	--	--	MG/KG	759	933	656	769	1250	653
Selenium	3.9	180	MG/KG	1.69 U	1.47 J	0.797 J	0.592 J	0.5 J	0.378 J
Silver	2	180	MG/KG	0.423 U	0.445 U	0.465 U	0.258 J	0.435 U	0.48 U
Sodium	--	--	MG/KG	191	358	107 J	151 J	654 J	64.6 J
Thallium	--	--	MG/KG	1.69 U	1.78 U	1.86 U	1.7 U	1.74 U	0.308 J
Vanadium	--	--	MG/KG	16.1	20.5	13.7	13	15.9	11.8
Zinc	109	10000	MG/KG	**134 J**	**1810**	78.4	**203**	**137**	35

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/23/2023	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	5.5 - 7.5	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	4950	7070	4810	6970	8780	6180
Antimony	--	--	MG/KG	4.38 U	0.341 J	4.33 U	5.12 U	5.41 U	0.443 J
Arsenic	13	16	MG/KG	2.13	3.69	2.16	4.18	12.2	5.48
Barium	350	400	MG/KG	22.6	60.5	23.4	52.2	86.7	127
Beryllium	7.2	72	MG/KG	0.189 J	0.24 J	0.199 J	0.147 J	0.457 J	0.345 J
Cadmium	2.5	4.3	MG/KG	0.876 U	0.893 U	0.867 U	0.152 J	0.218 J	0.482 J
Calcium	--	--	MG/KG	810	7360	3710	12600	36100	7740
Chromium, Hexavalent	1	110	MG/KG	0.899 U	0.485 J	0.896 U	1.06 U	1.13 U	1.01 U
Chromium, Total	30	180	MG/KG	8.96	13	10.4	16.8	17.6	12.8
Cobalt	--	--	MG/KG	4.57	6.49	5.12	5.72	5.72	4.39
Copper	50	270	MG/KG	9.6	26.1	19.8	43.7	30.7	**55.3**
Cyanide	27	27	MG/KG	1 UJ	0.4 J	1 UJ	1.2 UJ	1.3 UJ	0.38 J-
Iron	--	--	MG/KG	10900	17200	10800	13500	13400	13500
Lead	63	400	MG/KG	8.93	**71.8**	29	**85.2**	54.8	**286**
Magnesium	--	--	MG/KG	2050	2620	2270	3050	3430	2300
Manganese	1600	2000	MG/KG	324	404	168	237	260	300
Mercury	0.18	0.81	MG/KG	0.073 U	**1.68**	**6.47**	**0.698**	0.112	**0.384**
Nickel	30	310	MG/KG	10.5	15	12.2	13.5	14.3	11.9
Potassium	--	--	MG/KG	524	773	650	814	1520	846
Selenium	3.9	180	MG/KG	1.75 U	1.79 U	1.73 U	2.05 U	2.16 U	0.886 J
Silver	2	180	MG/KG	0.438 U	0.446 U	0.433 U	0.512 U	0.541 U	1.54
Sodium	--	--	MG/KG	46.6 J	69.8 J	75 J	239	431	113 J
Thallium	--	--	MG/KG	1.75 U	1.79 U	1.73 U	2.05 U	0.341 J	1.98 U
Vanadium	--	--	MG/KG	11	16	11.7	18.9	20.9	14.3
Zinc	109	10000	MG/KG	29.1	63.1	37.1	61.1	74.4	**229**

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11	SW-12
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	6280	9910	7090	6360	8210	10600
Antimony	--	--	MG/KG	4.38 U	4.79 U	4.53 U	4.59 U	4.64 U	5.05 U
Arsenic	13	16	MG/KG	1.66	1.23	5.6	3.92	1.78	2.79
Barium	350	400	MG/KG	30.4	15.5	55.2 J	99.1 J	40	29.6
Beryllium	7.2	72	MG/KG	0.357 J	0.288 J	0.368 J	0.317 J	0.349 J	0.355 J
Cadmium	2.5	4.3	MG/KG	0.176 J	0.132 J	0.221 J	0.277 J	0.143 J	0.185 J
Calcium	--	--	MG/KG	3330	681	1700 J	3200 J	761	1470
Chromium, Hexavalent	1	110	MG/KG	0.891 U	0.968 UJ	0.965 U	0.957 U	0.98 U	1.05 U
Chromium, Total	30	180	MG/KG	18	13	12.4	14.5	11.1	13.6
Cobalt	--	--	MG/KG	5.4	3.67	8.82	6.19	5.52	7.89
Copper	50	270	MG/KG	12	3.33	15.7	20.2	17.2	33.3
Cyanide	27	27	MG/KG	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.2 UJ
Iron	--	--	MG/KG	13300	12500	18500	12900	12400	15600
Lead	63	400	MG/KG	7.35	4.11 J	40 J	**171 J**	7.52	10.8
Magnesium	--	--	MG/KG	3110	2840	2290	2460	3080	3690
Manganese	1600	2000	MG/KG	728	84.4	203	335	92.1	183
Mercury	0.18	0.81	MG/KG	0.072 U	0.078 U	0.086 J	**0.343 J**	0.078 U	0.083 U
Nickel	30	310	MG/KG	13.3	13.2	15.5	13.5	13.7	17
Potassium	--	--	MG/KG	895	586	619	572	517	638
Selenium	3.9	180	MG/KG	1.75 U	1.92 U	1.81 U	1.83 U	1.86 U	2.02 U
Silver	2	180	MG/KG	0.438 U	0.479 U	0.453 U	0.459 U	0.464 U	0.505 U
Sodium	--	--	MG/KG	192	159 J	130 J	125 J	76.6 J	110 J
Thallium	--	--	MG/KG	1.75 U	1.92 U	1.81 U	1.83 U	1.86 U	2.02 U
Vanadium	--	--	MG/KG	12	14.6	16.2	13.9	14	16.7
Zinc	109	10000	MG/KG	33.9	28.6	57.8	80.4	42.8	57.4

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-13	SW-14	SW-14	SW-15	SW-16	SW-17
			Sample Date:	12/21/2022	12/21/2022	01/06/2023	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	7460	9430	8530	6500	9290	9990
Antimony	--	--	MG/KG	4.82 U	4.33 U	4.81 U	4.68 U	4.6 U	4.9 U
Arsenic	13	16	MG/KG	1.31	5.39	4.42	2.7	1.36	0.894 J
Barium	350	400	MG/KG	18.9	22.3	20.3	25.1	9.14	38.5
Beryllium	7.2	72	MG/KG	0.311 J	0.497	0.432 J	0.334 J	0.389 J	0.229 J
Cadmium	2.5	4.3	MG/KG	0.146 J	0.188 J	0.962 U	0.109 J	0.113 J	0.108 J
Calcium	--	--	MG/KG	2510	520	740	297	507	465
Chromium, Hexavalent	1	110	MG/KG	0.99 U	0.923 U	0.968 U	0.966 U	0.949 U	1.01 UJ
Chromium, Total	30	180	MG/KG	10.5	14	12.5	8.13	14.4	12.1
Cobalt	--	--	MG/KG	7.08	7.1	6.75	3.83	3.98	3.49
Copper	50	270	MG/KG	17.2	12.6	13.7	4.06	4.71	2.4
Cyanide	27	27	MG/KG	1.2 UJ	1.7 U	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ
Iron	--	--	MG/KG	11100	19400	15500	11000	13300	10000
Lead	63	400	MG/KG	7.87	9.86	11.2	7.71	5.8	3.65 J
Magnesium	--	--	MG/KG	3010	2360	2950	1420	2810	2810
Manganese	1600	2000	MG/KG	76.1	102	113	44.5	95.2	86.3
Mercury	0.18	0.81	MG/KG	0.078 U	0.128	0.079 U	0.077 U	0.076 U	0.081 U
Nickel	30	310	MG/KG	13.7	11.8	14.1	6.93	11.3	12.4
Potassium	--	--	MG/KG	473	464	428	345	521	648
Selenium	3.9	180	MG/KG	1.93 U	0.228 J	1.92 U	1.87 U	1.84 U	1.96 U
Silver	2	180	MG/KG	0.482 U	0.433 U	0.481 U	0.468 U	0.46 U	0.49 U
Sodium	--	--	MG/KG	148 J	112 J	167 J	163 J	192	125 J
Thallium	--	--	MG/KG	1.93 U	1.73 U	1.92 U	1.87 U	1.84 U	1.96 U
Vanadium	--	--	MG/KG	12.7	18.3	16.2	11.3	16.9	10.3
Zinc	109	10000	MG/KG	43.1	34.5	43.1	19.1	24	26.7

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-18	SW-19	SW-19E	SW-19N	SW-19S	SW-19W
			Sample Date:	12/21/2022	03/15/2023	03/15/2023	03/15/2023	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	22 - 24	16 - 18	16 - 18	16 - 18	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
Aluminum	--	--	MG/KG	8820	5560	5820	4890	5330	4650
Antimony	--	--	MG/KG	4.59 U	4.66 U	5.08 U	0.357 J	4.41 U	4.39 U
Arsenic	13	16	MG/KG	1.21	2.02	1.83	2.49	1.78	2.08
Barium	350	400	MG/KG	10.6	25	11.9	4.35	10.3	22.3
Beryllium	7.2	72	MG/KG	0.323 J	0.31 J	0.308 J	0.195 J	0.251 J	0.228 J
Cadmium	2.5	4.3	MG/KG	0.091 J	0.092 J	0.18 J	0.483 J	0.882 U	0.878 U
Calcium	--	--	MG/KG	1040	503	1410	372	534	579
Chromium, Hexavalent	1	110	MG/KG	0.963 U	0.208 J-	1.04 UJ	0.976 UJ	0.899 UJ	0.902 UJ
Chromium, Total	30	180	MG/KG	11.4	10.8	12.3	14.6	8.14	9.65
Cobalt	--	--	MG/KG	3.86	5.48	4.4	2.9	3.9	3.99
Copper	50	270	MG/KG	2.66	10.5	10.6	7.48	8.4	7.89
Cyanide	27	27	MG/KG	1.1 UJ	1.2 UJ	0.34 J-	0.28 J-	1.1 UJ	1.1 UJ
Iron	--	--	MG/KG	10300	12900	11900	15300	12800	10700
Lead	63	400	MG/KG	4.13 J	4.83	14.5	5.18	4.63	4.46
Magnesium	--	--	MG/KG	2650	2270	2450	1850 J	2150	1940
Manganese	1600	2000	MG/KG	102	127	100	64.7 J	123	108
Mercury	0.18	0.81	MG/KG	0.077 U	0.078 U	0.078 J	0.078 U	0.072 U	0.071 U
Nickel	30	310	MG/KG	12.9	11.6	12.4	8.24 J	10.9	9.66
Potassium	--	--	MG/KG	503	507	522	457	409	401
Selenium	3.9	180	MG/KG	1.84 U	1.86 U	0.275 J	1.83 U	1.76 U	1.76 U
Silver	2	180	MG/KG	0.459 U	0.466 U	0.508 U	0.458 U	0.441 U	0.439 U
Sodium	--	--	MG/KG	96.5 J	125 J	81.2 J	46.1 J	69.6 J	65.7 J
Thallium	--	--	MG/KG	1.84 U	1.86 U	2.03 U	0.53 J	1.76 U	1.76 U
Vanadium	--	--	MG/KG	10.6	12.5	12.5	14.4	11.5	9.88
Zinc	109	10000	MG/KG	30	27.4	30.1	21.9	24.5	21.8

Table 3c. Summary of Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-20	SW-21
			Sample Date:	01/06/2023	01/06/2023
			Sample Depth (ft bls):	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units		
Aluminum	--	--	MG/KG	5410	5790
Antimony	--	--	MG/KG	0.389 J	4.71 U
Arsenic	13	16	MG/KG	2.27	1.98
Barium	350	400	MG/KG	31.8	6.59
Beryllium	7.2	72	MG/KG	0.291 J	0.266 J
Cadmium	2.5	4.3	MG/KG	0.957 U	0.942 U
Calcium	--	--	MG/KG	868	636
Chromium, Hexavalent	1	110	MG/KG	0.254 J	0.97 U
Chromium, Total	30	180	MG/KG	19.4	9.81
Cobalt	--	--	MG/KG	4.21	3.7
Copper	50	270	MG/KG	11	5.09
Cyanide	27	27	MG/KG	1.1 UJ	1.2 UJ
Iron	--	--	MG/KG	12800	10700
Lead	63	400	MG/KG	4.82	4.68 J
Magnesium	--	--	MG/KG	2360	1750
Manganese	1600	2000	MG/KG	106	84.7
Mercury	0.18	0.81	MG/KG	0.085 U	0.084 U
Nickel	30	310	MG/KG	11.8	9.71
Potassium	--	--	MG/KG	537	366
Selenium	3.9	180	MG/KG	1.91 U	1.88 U
Silver	2	180	MG/KG	0.478 U	0.471 U
Sodium	--	--	MG/KG	46.7 J	104 J
Thallium	--	--	MG/KG	1.91 U	1.88 U
Vanadium	--	--	MG/KG	12.8	11.7
Zinc	109	10000	MG/KG	27	20

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5	EP-6
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022	11/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0421 U	0.0402 U	0.0422 U	0.0412 U	0.0354 U	0.0337 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-7	EP-8	EP-9	EP-9	EP-10	EP-11
			Sample Date:	12/01/2022	10/20/2022	12/01/2022	12/01/2022	11/08/2022	10/20/2022
			Sample Depth (ft bls):	8 - 10	10 - 12	11 - 13	11 - 13	14 - 16	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	FD	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0375 U	0.00586 J	0.0381 U	0.038 U	0.04 U	0.00558 J
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0375 U	0.0384 U	0.0381 U	0.038 U	0.04 U	0.0384 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0375 U	0.00586 J	0.0381 U	0.038 U	0.04 U	0.00558 J

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-12	EP-13	EP-14	EP-15	EP-16	EP-17
			Sample Date:	11/08/2022	12/01/2022	11/08/2022	10/07/2022	10/07/2022	10/07/2022
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	6 - 8	9 - 11	9 - 11
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0392 U	0.0393 U	0.0382 U	0.042 U	0.0411 U	0.0376 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-18	EP-19	EP-20	EP-21	EP-22	EP-23
			Sample Date:	12/08/2022	10/07/2022	10/25/2022	01/26/2023	01/26/2023	01/26/2023
			Sample Depth (ft bls):	13 - 15	8 - 10	11 - 13	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0387 U	0.0399 U	0.0396 U	0.0368 U	0.0369 U	0.0374 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0346 U	0.0359 U	0.0394 U	0.0368 U	0.0348 U	0.0371 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2	SW-3
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023	02/24/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5	6.5 - 8.5
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.138 J	0.0369 U	0.0365 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0394 U	0.0365 U	0.0362 U	0.0397 U	0.0369 U	0.0365 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0394 U	0.0365 U	0.0362 U	**0.138**	0.0369 U	0.0365 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-4	SW-5	SW-6	SW-7	SW-8	SW-9
			Sample Date:	02/23/2023	02/23/2023	12/09/2022	12/09/2022	12/09/2022	12/21/2022
			Sample Depth (ft bls):	5 - 7	8 - 10	8 - 10	4 - 6	6.5 - 8.5	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0356 U	0.042 U	0.0458 U	0.0411 U	0.0368 U	0.0392 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-10	SW-10	SW-11	SW-12	SW-13	SW-14
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	14 - 16	14 - 16	15 - 17	15 - 17	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0205 J
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0367 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0399 U	0.039 U	0.0386 U	0.043 U	0.0396 U	0.0205 J

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-14	SW-15	SW-16	SW-17	SW-18	SW-19
			Sample Date:	01/06/2023	12/21/2022	12/21/2022	12/21/2022	12/21/2022	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	14 - 16	14 - 16	22 - 24
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0392 U	0.0387 U	0.0378 U	0.041 U	0.039 U	0.0388 U

Table 3d. Summary of Polychlorinated Biphenyls in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19E	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units						
PCB-1016 (Aroclor 1016)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1221 (Aroclor 1221)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1232 (Aroclor 1232)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1242 (Aroclor 1242)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1248 (Aroclor 1248)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1254 (Aroclor 1254)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1260 (Aroclor 1260)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1262 (Aroclor 1262)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
PCB-1268 (Aroclor 1268)	--	--	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U
Polychlorinated Biphenyl (PCBs)	0.1	1	MG/KG	0.0423 U	0.0392 U	0.036 U	0.0365 U	0.0397 U	0.0392 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4	EP-5
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/09/2023	12/08/2022
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18	10 - 12
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	0.217 U	0.201 U	0.208 U	NA	0.177 U
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.217 U	0.201 U	0.208 U	0.21 U	0.177 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.217 U	0.201 U	0.208 U	0.21 U	0.177 U
Aldrin	0.005	0.097	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.00087 U	0.000784 U	0.000835 U	0.000806 U	0.000692 U
Alpha Endosulfan	2.4	24	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Beta Endosulfan	2.4	24	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Chlordane	--	--	MG/KG	0.0174 U	0.0157 U	0.0167 U	0.0161 U	0.0138 U
cis-Chlordane	0.094	4.2	MG/KG	0.00261 U	0.00235 U	0.0025 U	0.00242 U	0.00208 U
Dalapon	--	--	MG/KG	0.0434 U	0.0402 U	0.0416 U	NA	0.0354 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Dicamba	--	--	MG/KG	0.0434 U	0.0402 U	0.0416 U	NA	0.0354 U
Dichloroprop	--	--	MG/KG	0.0434 U	0.0402 U	0.0416 U	NA	0.0354 U
Dieldrin	0.005	0.2	MG/KG	0.0013 U	0.00118 U	0.00125 U	0.00121 U	0.00104 U
Endosulfan Sulfate	2.4	24	MG/KG	0.00087 U	0.000784 U	0.000835 U	0.000806 U	0.000692 U
Endrin	0.014	11	MG/KG	0.00087 U	0.000784 U	0.000835 U	0.000806 U	0.000692 U
Endrin Aldehyde	--	--	MG/KG	0.00261 U	0.00235 U	0.0025 U	0.00242 U	0.00208 U
Endrin Ketone	--	--	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.00087 U	0.000784 U	0.000835 U	0.000806 U	0.000692 U
Heptachlor	0.042	2.1	MG/KG	0.00104 U	0.000941 U	0.001 U	0.000967 U	0.00083 U
Heptachlor Epoxide	--	--	MG/KG	0.00392 U	0.00353 U	0.00376 U	0.00362 U	0.00311 U
MCPA	--	--	MG/KG	4.34 U	4.02 U	4.16 U	NA	3.54 U
Methoxychlor	--	--	MG/KG	0.00392 U	0.00353 U	0.00376 U	0.00362 U	0.00311 U
P,P'-DDD	0.0033	13	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00209 U	0.00188 U	0.002 U	0.00193 U	0.00166 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.217 U	0.201 U	0.208 U	0.21 U	0.177 U
Toxaphene	--	--	MG/KG	0.0392 U	0.0353 U	0.0376 U	0.0362 U	0.0311 U
trans-Chlordane	--	--	MG/KG	0.00261 U	0.00235 U	0.0025 U	0.00242 U	0.00208 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-6	EP-7	EP-8	EP-9	EP-9
			Sample Date:	11/08/2022	12/01/2022	10/20/2022	12/01/2022	12/01/2022
			Sample Depth (ft bls):	11 - 13	8 - 10	10 - 12	11 - 13	11 - 13
			Normal Sample or Field Duplicate:	N	N	N	N	FD
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	0.184 U	NA	0.19 U	0.191 U
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.174 U	0.184 U	0.19 U	0.19 U	0.191 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.174 U	0.184 U	0.19 U	0.19 U	0.191 U
Aldrin	0.005	0.097	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000702 U	0.000714 U	0.000774 U	0.000753 U	0.000753 U
Alpha Endosulfan	2.4	24	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Beta Endosulfan	2.4	24	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Chlordane	--	--	MG/KG	0.014 U	0.0143 U	0.0155 U	0.015 U	0.0151 U
cis-Chlordane	0.094	4.2	MG/KG	0.00211 U	0.00214 U	0.00232 U	0.00226 U	0.00226 U
Dalapon	--	--	MG/KG	NA	0.0368 U	NA	0.038 U	0.0382 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Dicamba	--	--	MG/KG	NA	0.0368 U	NA	0.038 U	0.0382 U
Dichloroprop	--	--	MG/KG	NA	0.0368 U	NA	0.038 U	0.0382 U
Dieldrin	0.005	0.2	MG/KG	0.00105 U	0.00107 U	0.00116 U	0.00113 U	0.00113 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000702 U	0.000714 U	0.000774 U	0.000753 U	0.000753 U
Endrin	0.014	11	MG/KG	0.000702 U	0.000714 U	0.000774 U	0.000753 U	0.000753 U
Endrin Aldehyde	--	--	MG/KG	0.00211 U	0.00214 U	0.00232 U	0.00226 U	0.00226 U
Endrin Ketone	--	--	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000702 U	0.000714 U	0.000774 U	0.000753 U	0.000753 U
Heptachlor	0.042	2.1	MG/KG	0.000843 U	0.000857 U	0.000929 U	0.000904 U	0.000904 U
Heptachlor Epoxide	--	--	MG/KG	0.00316 U	0.00321 U	0.00348 U	0.00339 U	0.00339 U
MCPA	--	--	MG/KG	NA	3.68 U	NA	3.8 U	3.82 U
Methoxychlor	--	--	MG/KG	0.00316 U	0.00321 U	0.00348 U	0.00339 U	0.00339 U
P,P'-DDD	0.0033	13	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00168 U	0.00171 U	0.00186 U	0.00181 U	0.00181 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.174 U	0.184 U	0.19 U	0.19 U	0.191 U
Toxaphene	--	--	MG/KG	0.0316 U	0.0321 U	0.0348 U	0.0339 U	0.0339 U
trans-Chlordane	--	--	MG/KG	0.00211 U	0.00214 U	0.00232 U	0.00226 U	0.00226 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-10	EP-11	EP-12	EP-13	EP-14
			Sample Date:	11/08/2022	10/20/2022	11/08/2022	12/01/2022	11/08/2022
			Sample Depth (ft bls):	14 - 16	13 - 15	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	0.198 U	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.212 U	0.192 U	0.203 U	0.198 U	0.196 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.212 U	0.192 U	0.203 U	0.198 U	0.196 U
Aldrin	0.005	0.097	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000806 U	0.000788 U	0.000812 U	0.000776 U	0.000767 U
Alpha Endosulfan	2.4	24	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Beta Endosulfan	2.4	24	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Chlordane	--	--	MG/KG	0.0161 U	0.0158 U	0.0162 U	0.0155 U	0.0153 U
cis-Chlordane	0.094	4.2	MG/KG	0.00242 U	0.00236 U	0.00244 U	0.00233 U	0.0023 U
Dalapon	--	--	MG/KG	NA	NA	NA	0.0397 U	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Dicamba	--	--	MG/KG	NA	NA	NA	0.0397 U	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	0.0397 U	NA
Dieldrin	0.005	0.2	MG/KG	0.00121 U	0.00118 U	0.00122 U	0.00116 U	0.00115 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000806 U	0.000788 U	0.000812 U	0.000776 U	0.000767 U
Endrin	0.014	11	MG/KG	0.000806 U	0.000788 U	0.000812 U	0.000776 U	0.000767 U
Endrin Aldehyde	--	--	MG/KG	0.00242 U	0.00236 U	0.00244 U	0.00233 U	0.0023 U
Endrin Ketone	--	--	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000806 U	0.000788 U	0.000812 U	0.000776 U	0.000767 U
Heptachlor	0.042	2.1	MG/KG	0.000967 U	0.000946 U	0.000974 U	0.000932 U	0.00092 U
Heptachlor Epoxide	--	--	MG/KG	0.00362 U	0.00355 U	0.00365 U	0.00349 U	0.00345 U
MCPA	--	--	MG/KG	NA	NA	NA	3.97 U	NA
Methoxychlor	--	--	MG/KG	0.00362 U	0.00355 U	0.00365 U	0.00349 U	0.00345 U
P,P'-DDD	0.0033	13	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00193 U	0.00189 U	0.00195 U	0.00186 U	0.00184 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.212 U	0.192 U	0.203 U	0.198 U	0.196 U
Toxaphene	--	--	MG/KG	0.0362 U	0.0355 U	0.0365 U	0.0349 U	0.0345 U
trans-Chlordane	--	--	MG/KG	0.00242 U	0.00236 U	0.00244 U	0.00233 U	0.0023 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18	EP-19
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022	10/07/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	0.2 U	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.212 U	0.208 U	0.193 U	0.2 U	0.198 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.212 U	0.208 U	0.193 U	0.2 U	0.198 U
Aldrin	0.005	0.097	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000821 U	0.000815 U	0.000772 U	0.000774 U	0.00077 U
Alpha Endosulfan	2.4	24	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Beta Endosulfan	2.4	24	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Chlordane	--	--	MG/KG	0.0164 U	0.0163 U	0.0154 U	0.0155 U	0.0154 U
cis-Chlordane	0.094	4.2	MG/KG	0.00246 U	0.00244 U	0.00232 U	0.00232 U	0.00231 U
Dalapon	--	--	MG/KG	NA	NA	NA	0.0399 U	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Dicamba	--	--	MG/KG	NA	NA	NA	0.0399 U	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	0.0399 U	NA
Dieldrin	0.005	0.2	MG/KG	0.00123 U	0.00122 U	0.00116 U	0.00116 U	0.00115 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000821 U	0.000815 U	0.000772 U	0.000774 U	0.00077 U
Endrin	0.014	11	MG/KG	0.000821 U	0.000815 U	0.000772 U	0.000774 U	0.00077 U
Endrin Aldehyde	--	--	MG/KG	0.00246 U	0.00244 U	0.00232 U	0.00232 U	0.00231 U
Endrin Ketone	--	--	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000821 U	0.000815 U	0.000772 U	0.000774 U	0.00077 U
Heptachlor	0.042	2.1	MG/KG	0.000986 U	0.000978 U	0.000926 U	0.000929 U	0.000924 U
Heptachlor Epoxide	--	--	MG/KG	0.0037 U	0.00367 U	0.00347 U	0.00348 U	0.00346 U
MCPA	--	--	MG/KG	NA	NA	NA	3.99 U	NA
Methoxychlor	--	--	MG/KG	0.0037 U	0.00367 U	0.00347 U	0.00348 U	0.00346 U
P,P'-DDD	0.0033	13	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00197 U	0.00196 U	0.00185 U	0.00186 U	0.00185 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.212 U	0.208 U	0.193 U	0.2 U	0.198 U
Toxaphene	--	--	MG/KG	0.037 U	0.0367 U	0.0347 U	0.0348 U	0.0346 U
trans-Chlordane	--	--	MG/KG	0.00246 U	0.00244 U	0.00232 U	0.00232 U	0.00231 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-20	EP-21	EP-22	EP-23	EP-24
			Sample Date:	10/25/2022	01/26/2023	01/26/2023	01/26/2023	02/06/2023
			Sample Depth (ft bls):	11 - 13	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.206 U	0.193 U	0.19 U	0.191 U	0.178 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.206 U	0.193 U	0.19 U	0.191 U	0.178 U
Aldrin	0.005	0.097	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000799 U	0.00074 U	0.000739 U	0.00077 U	0.000722 U
Alpha Endosulfan	2.4	24	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Beta Endosulfan	2.4	24	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Chlordane	--	--	MG/KG	0.016 U	0.0148 U	0.0148 U	0.0154 U	0.0144 U
cis-Chlordane	0.094	4.2	MG/KG	0.0024 U	0.00222 U	0.00222 U	0.00231 U	0.00216 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.0012 U	0.00111 U	0.00111 U	0.00116 U	0.00108 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000799 U	0.00074 U	0.000739 U	0.004 IP	0.000722 U
Endrin	0.014	11	MG/KG	0.000799 U	0.00074 U	0.000739 U	0.00077 U	0.000722 U
Endrin Aldehyde	--	--	MG/KG	0.0024 U	0.00222 U	0.00222 U	0.00231 U	0.00216 U
Endrin Ketone	--	--	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000799 U	0.00074 U	0.000739 U	0.00077 U	0.000722 U
Heptachlor	0.042	2.1	MG/KG	0.000959 U	0.000888 U	0.000887 U	0.000924 U	0.000866 U
Heptachlor Epoxide	--	--	MG/KG	0.0036 U	0.00333 U	0.00333 U	0.00347 U	0.00325 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.0036 U	0.00333 U	0.00333 U	0.00347 U	0.00325 U
P,P'-DDD	0.0033	13	MG/KG	0.00192 U	0.00178 U	0.00166 J	0.00185 U	0.00173 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00192 U	0.00178 U	0.00217	0.00185 U	0.00173 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00192 U	0.00178 U	0.00177 U	0.00185 U	0.00173 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.206 U	0.193 U	0.19 U	0.191 U	0.178 U
Toxaphene	--	--	MG/KG	0.036 U	0.0333 U	0.0333 U	0.0347 U	0.0325 U
trans-Chlordane	--	--	MG/KG	0.0024 U	0.00222 U	0.00222 U	0.00231 U	0.00216 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-24	EP-25	EP-26	EP-27	EP-28
			Sample Date:	02/06/2023	01/31/2023	01/26/2023	02/06/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	FD	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.184 U	0.198 U	0.186 U	0.177 U	0.189 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.184 U	0.198 U	0.186 U	0.177 U	0.189 U
Aldrin	0.005	0.097	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000723 U	0.00081 U	0.000756 U	0.000715 U	0.000755 U
Alpha Endosulfan	2.4	24	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Beta Endosulfan	2.4	24	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Chlordane	--	--	MG/KG	0.0144 U	0.0162 U	0.0151 U	0.0143 U	0.0151 U
cis-Chlordane	0.094	4.2	MG/KG	0.00217 U	0.00243 U	0.00227 U	0.00215 U	0.00227 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.00108 U	0.00122 U	0.00113 U	0.00107 U	0.00113 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000723 U	0.00081 U	0.000756 U	0.000715 U	0.000755 U
Endrin	0.014	11	MG/KG	0.000723 U	0.00081 U	0.000756 U	0.000715 U	0.000755 U
Endrin Aldehyde	--	--	MG/KG	0.00217 U	0.00243 U	0.00227 U	0.00215 U	0.00227 U
Endrin Ketone	--	--	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000723 U	0.00081 U	0.000756 U	0.000715 U	0.000755 U
Heptachlor	0.042	2.1	MG/KG	0.000867 U	0.000972 U	0.000907 U	0.000858 U	0.000906 U
Heptachlor Epoxide	--	--	MG/KG	0.00325 U	0.00364 U	0.0034 U	0.00322 U	0.0034 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00325 U	0.00364 U	0.0034 U	0.00322 U	0.0034 U
P,P'-DDD	0.0033	13	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00173 U	0.00194 U	0.00181 U	0.00172 U	0.00181 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.184 U	0.198 U	0.186 U	0.177 U	0.189 U
Toxaphene	--	--	MG/KG	0.0325 U	0.0364 U	0.034 U	0.0322 U	0.034 U
trans-Chlordane	--	--	MG/KG	0.00217 U	0.00243 U	0.00227 U	0.00215 U	0.00227 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1	SW-2
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023	02/23/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5	5.5 - 7.5
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.199 U	0.187 U	0.189 U	0.209 U	0.182 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.199 U	0.187 U	0.189 U	0.209 U	0.182 U
Aldrin	0.005	0.097	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.00078 U	0.000737 U	0.000749 U	0.000803 U	0.000732 U
Alpha Endosulfan	2.4	24	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Beta Endosulfan	2.4	24	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Chlordane	--	--	MG/KG	0.0156 U	0.0147 U	0.015 U	0.016 U	0.0146 U
cis-Chlordane	0.094	4.2	MG/KG	0.00234 U	0.00221 U	0.00225 U	0.00241 U	0.00219 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.00117 U	0.0011 U	0.00112 U	0.0012 U	0.0011 U
Endosulfan Sulfate	2.4	24	MG/KG	0.00078 U	0.000737 U	0.000749 U	0.000803 U	0.000732 U
Endrin	0.014	11	MG/KG	0.00078 U	0.000737 U	0.000749 U	0.000803 U	0.000732 U
Endrin Aldehyde	--	--	MG/KG	0.00234 U	0.00221 U	0.00225 U	0.00241 U	0.00219 U
Endrin Ketone	--	--	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.00078 U	0.000737 U	0.000749 U	0.000803 U	0.000732 U
Heptachlor	0.042	2.1	MG/KG	0.000936 U	0.000884 U	0.000899 U	0.000963 U	0.000878 U
Heptachlor Epoxide	--	--	MG/KG	0.00351 U	0.00331 U	0.00337 U	0.00361 U	0.00329 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00351 U	0.00331 U	0.00337 U	0.00361 U	0.00329 U
P,P'-DDD	0.0033	13	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00187 U	0.00177 U	0.0018 U	0.00193 U	0.00176 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.199 U	0.187 U	0.189 U	0.209 U	0.182 U
Toxaphene	--	--	MG/KG	0.0351 U	0.0331 U	0.0337 U	0.0361 U	0.0329 U
trans-Chlordane	--	--	MG/KG	0.00234 U	0.00221 U	0.00225 U	0.00241 U	0.00219 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-3	SW-4	SW-5	SW-6	SW-7
			Sample Date:	02/24/2023	02/23/2023	02/23/2023	12/09/2022	12/09/2022
			Sample Depth (ft bls):	6.5 - 8.5	5 - 7	8 - 10	8 - 10	4 - 6
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.19 U	0.181 U	0.216 U	0.23 U	0.205 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.19 U	0.181 U	0.216 U	0.23 U	0.205 U
Aldrin	0.005	0.097	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000726 U	0.000711 U	0.00084 U	0.000906 U	0.000827 U
Alpha Endosulfan	2.4	24	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Beta Endosulfan	2.4	24	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Chlordane	--	--	MG/KG	0.0145 U	0.0142 U	0.0168 U	0.0181 U	0.0165 U
cis-Chlordane	0.094	4.2	MG/KG	0.00218 U	0.00213 U	0.00252 U	0.00272 U	0.00248 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.00109 U	0.00107 U	0.00126 U	0.00136 U	0.00124 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000726 U	0.000711 U	0.00084 U	0.000906 U	0.000827 U
Endrin	0.014	11	MG/KG	0.000726 U	0.000711 U	0.00084 U	0.000906 U	0.000827 U
Endrin Aldehyde	--	--	MG/KG	0.00218 U	0.00213 U	0.00252 U	0.00272 U	0.00248 U
Endrin Ketone	--	--	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000726 U	0.000711 U	0.00084 U	0.000906 U	0.000827 U
Heptachlor	0.042	2.1	MG/KG	0.000871 U	0.000853 U	0.00101 U	0.00109 U	0.000992 U
Heptachlor Epoxide	--	--	MG/KG	0.00327 U	0.0032 U	0.00378 U	0.00408 U	0.00372 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00327 U	0.0032 U	0.00378 U	0.00408 U	0.00372 U
P,P'-DDD	0.0033	13	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00174 U	0.00171 U	0.00202 U	0.00218 U	0.00198 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.19 U	0.181 U	0.216 U	0.23 U	0.205 U
Toxaphene	--	--	MG/KG	0.0327 U	0.032 U	0.0378 U	0.0408 U	0.0372 U
trans-Chlordane	--	--	MG/KG	0.00218 U	0.00213 U	0.00252 U	0.00272 U	0.00248 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-8	SW-9	SW-10	SW-10	SW-11
			Sample Date:	12/09/2022	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	6.5 - 8.5	14 - 16	14 - 16	14 - 16	15 - 17
			Normal Sample or Field Duplicate:	N	N	N	FD	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.182 U	0.2 U	0.196 U	0.196 U	0.204 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.182 U	0.2 U	0.196 U	0.196 U	0.204 U
Aldrin	0.005	0.097	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000727 U	0.000784 U	0.000794 U	0.00077 U	0.000776 U
Alpha Endosulfan	2.4	24	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Beta Endosulfan	2.4	24	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Chlordane	--	--	MG/KG	0.0145 U	0.0157 U	0.0159 U	0.0154 U	0.0155 U
cis-Chlordane	0.094	4.2	MG/KG	0.00218 U	0.00235 U	0.00238 U	0.00231 U	0.00233 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.00109 U	0.00118 U	0.00119 U	0.00116 U	0.00116 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000727 U	0.000784 U	0.000794 U	0.00077 U	0.000776 U
Endrin	0.014	11	MG/KG	0.000727 U	0.000784 U	0.000794 U	0.00077 U	0.000776 U
Endrin Aldehyde	--	--	MG/KG	0.00218 U	0.00235 U	0.00238 U	0.00231 U	0.00233 U
Endrin Ketone	--	--	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000727 U	0.000784 U	0.000794 U	0.00077 U	0.000776 U
Heptachlor	0.042	2.1	MG/KG	0.000873 U	0.00094 U	0.000953 U	0.000924 U	0.000931 U
Heptachlor Epoxide	--	--	MG/KG	0.00327 U	0.00353 U	0.00357 U	0.00347 U	0.00349 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00327 U	0.00353 U	0.00357 U	0.00347 U	0.00349 U
P,P'-DDD	0.0033	13	MG/KG	0.00194	0.00188 U	0.0019 U	0.00185 U	0.00186 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00174 U	0.00188 U	0.0019 U	0.00185 U	0.00186 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00217	0.00188 U	0.0019 U	0.00185 U	0.00186 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.182 U	0.2 U	0.196 U	0.196 U	0.204 U
Toxaphene	--	--	MG/KG	0.0327 U	0.0353 U	0.0357 U	0.0347 U	0.0349 U
trans-Chlordane	--	--	MG/KG	0.00218 U	0.00235 U	0.00238 U	0.00231 U	0.00233 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-12	SW-13	SW-14	SW-14	SW-15
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	01/06/2023	12/21/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.215 U	0.203 U	0.192 U	0.199 U	0.198 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.215 U	0.203 U	0.192 U	0.199 U	0.198 U
Aldrin	0.005	0.097	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000864 U	0.00081 U	0.000754 U	0.000786 U	0.000792 U
Alpha Endosulfan	2.4	24	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Beta Endosulfan	2.4	24	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Chlordane	--	--	MG/KG	0.0173 U	0.0162 U	0.0151 U	0.0157 U	0.0158 U
cis-Chlordane	0.094	4.2	MG/KG	0.00259 U	0.00243 U	0.00226 U	0.00236 U	0.00238 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.0013 U	0.00121 U	0.00113 U	0.00118 U	0.00119 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000864 U	0.00081 U	0.000754 U	0.000786 U	0.000792 U
Endrin	0.014	11	MG/KG	0.000864 U	0.00081 U	0.000754 U	0.000786 U	0.000792 U
Endrin Aldehyde	--	--	MG/KG	0.00259 U	0.00243 U	0.00226 U	0.00236 U	0.00238 U
Endrin Ketone	--	--	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000864 U	0.00081 U	0.000754 U	0.000786 U	0.000792 U
Heptachlor	0.042	2.1	MG/KG	0.00104 U	0.000972 U	0.000905 U	0.000943 U	0.00095 U
Heptachlor Epoxide	--	--	MG/KG	0.00389 U	0.00364 U	0.00339 U	0.00354 U	0.00356 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00389 U	0.00364 U	0.00339 U	0.00354 U	0.00356 U
P,P'-DDD	0.0033	13	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00207 U	0.00194 U	0.00181 U	0.00188 U	0.0019 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.215 U	0.203 U	0.192 U	0.199 U	0.198 U
Toxaphene	--	--	MG/KG	0.0389 U	0.0364 U	0.0339 U	0.0354 U	0.0356 U
trans-Chlordane	--	--	MG/KG	0.00259 U	0.00243 U	0.00226 U	0.00236 U	0.00238 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19	SW-19E
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.194 U	0.207 U	0.197 U	0.197 U	0.212 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.194 U	0.207 U	0.197 U	0.197 U	0.212 U
Aldrin	0.005	0.097	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000769 U	0.000798 U	0.000762 U	0.000789 U	0.000838 U
Alpha Endosulfan	2.4	24	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Beta Endosulfan	2.4	24	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Chlordane	--	--	MG/KG	0.0154 U	0.016 U	0.0152 U	0.0158 U	0.0168 U
cis-Chlordane	0.094	4.2	MG/KG	0.00231 U	0.00239 U	0.00229 U	0.00237 U	0.00251 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.00115 U	0.0012 U	0.00114 U	0.00118 U	0.00126 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000769 U	0.000798 U	0.000762 U	0.000789 U	0.000838 U
Endrin	0.014	11	MG/KG	0.000769 U	0.000798 U	0.000762 U	0.000789 U	0.000838 U
Endrin Aldehyde	--	--	MG/KG	0.00231 U	0.00239 U	0.00229 U	0.00237 U	0.00251 U
Endrin Ketone	--	--	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000769 U	0.000798 U	0.000762 U	0.000789 U	0.000838 U
Heptachlor	0.042	2.1	MG/KG	0.000922 U	0.000957 U	0.000914 U	0.000947 U	0.001 U
Heptachlor Epoxide	--	--	MG/KG	0.00346 U	0.00359 U	0.00343 U	0.00355 U	0.00377 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00346 U	0.00359 U	0.00343 U	0.00355 U	0.00377 U
P,P'-DDD	0.0033	13	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00184 U	0.00191 U	0.00183 U	0.00189 U	0.00201 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.194 U	0.207 U	0.197 U	0.197 U	0.212 U
Toxaphene	--	--	MG/KG	0.0346 U	0.0359 U	0.0343 U	0.0355 U	0.0377 U
trans-Chlordane	--	--	MG/KG	0.00231 U	0.00239 U	0.00229 U	0.00237 U	0.00251 U

Table 3e. Summary of Pesticides and Herbicides in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19N	SW-19S	SW-19W	SW-20	SW-21
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	01/06/2023	01/06/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use SCO**	NYSDEC Part 375 Restricted Residential SCO	Units					
2,4-(Dichlorophenoxy)butyric acid	--	--	MG/KG	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	--	--	MG/KG	0.198 U	0.181 U	0.186 U	0.2 U	0.202 U
Acetic acid, (2,4,5-trichlorophenoxy)-	--	--	MG/KG	0.198 U	0.181 U	0.186 U	0.2 U	0.202 U
Aldrin	0.005	0.097	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	MG/KG	0.000784 U	0.000711 U	0.000724 U	0.000792 U	0.000792 U
Alpha Endosulfan	2.4	24	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Beta Endosulfan	2.4	24	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Chlordane	--	--	MG/KG	0.0157 U	0.0142 U	0.0145 U	0.0158 U	0.0158 U
cis-Chlordane	0.094	4.2	MG/KG	0.00235 U	0.00213 U	0.00217 U	0.00238 U	0.00238 U
Dalapon	--	--	MG/KG	NA	NA	NA	NA	NA
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Dicamba	--	--	MG/KG	NA	NA	NA	NA	NA
Dichloroprop	--	--	MG/KG	NA	NA	NA	NA	NA
Dieldrin	0.005	0.2	MG/KG	0.00118 U	0.00107 U	0.00109 U	0.00119 U	0.00119 U
Endosulfan Sulfate	2.4	24	MG/KG	0.000784 U	0.000711 U	0.000724 U	0.000792 U	0.000792 U
Endrin	0.014	11	MG/KG	0.000784 U	0.000711 U	0.000724 U	0.000792 U	0.000792 U
Endrin Aldehyde	--	--	MG/KG	0.00235 U	0.00213 U	0.00217 U	0.00238 U	0.00238 U
Endrin Ketone	--	--	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Gamma Bhc (Lindane)	0.1	1.3	MG/KG	0.000784 U	0.000711 U	0.000724 U	0.000792 U	0.000792 U
Heptachlor	0.042	2.1	MG/KG	0.00094 U	0.000853 U	0.000869 U	0.00095 U	0.000951 U
Heptachlor Epoxide	--	--	MG/KG	0.00353 U	0.0032 U	0.00326 U	0.00356 U	0.00356 U
MCPA	--	--	MG/KG	NA	NA	NA	NA	NA
Methoxychlor	--	--	MG/KG	0.00353 U	0.0032 U	0.00326 U	0.00356 U	0.00356 U
P,P'-DDD	0.0033	13	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
P,P'-DDE	0.0033	8.9	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
P,P'-DDT	0.0033	7.9	MG/KG	0.00188 U	0.0017 U	0.00174 U	0.0019 U	0.0019 U
Silvex (2,4,5-TP)	3.8	100	MG/KG	0.198 U	0.181 U	0.186 U	0.2 U	0.202 U
Toxaphene	--	--	MG/KG	0.0353 U	0.032 U	0.0326 U	0.0356 U	0.0356 U
trans-Chlordane	--	--	MG/KG	0.00235 U	0.00213 U	0.00217 U	0.00238 U	0.00238 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-1	EP-2	EP-3	EP-4
			Sample Date:	11/29/2022	11/28/2022	11/29/2022	02/08/2023
			Sample Depth (ft bls):	13 - 15	13 - 15	9 - 11	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.296 U	0.283 U	0.301 UJ	0.304 U
Perfluorobutanoic Acid	--	--	NG/G	0.592 U	0.567 UJ	0.602 U	0.608 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.296 U	0.283 UJ	0.301 U	0.304 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.296 U	0.283 UJ	0.301 UJ	0.304 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.296 U	0.283 U	0.301 UJ	0.304 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.592 UJ	0.567 UJ	0.602 UJ	0.608 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.296 U	0.283 UJ	0.301 U	0.304 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.296 U	0.283 U	0.301 U	0.304 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.296 U	0.283 UJ	0.096 J	0.304 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.592 UJ	0.567 UJ	0.602 UJ	0.608 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.592 U	0.567 U	0.602 U	0.608 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.296 U	0.283 U	0.096 J	0.304 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-5	EP-6	EP-7	EP-8
			Sample Date:	12/08/2022	11/08/2022	12/01/2022	10/20/2022
			Sample Depth (ft bls):	10 - 12	11 - 13	8 - 10	12 - 14
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluorobutanoic Acid	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.258 U	0.326 U	0.315 U	0.266 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.516 U	0.652 U	0.63 U	0.531 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.258 U	0.326 U	0.315 U	0.266 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-9	EP-9	EP-10	EP-10
			Sample Date:	12/01/2022	12/01/2022	10/20/2022	11/08/2022
			Sample Depth (ft bls):	11 - 13	11 - 13	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	FD	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluorobutanoic Acid	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.307 U	0.274 U	0.29 U	0.313 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.613 U	0.548 U	0.581 U	0.627 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.307 U	0.274 U	0.29 U	0.313 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-11	EP-12	EP-13	EP-14
			Sample Date:	10/20/2022	10/20/2022	12/01/2022	10/20/2022
			Sample Depth (ft bls):	15 - 17	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluorobutanoic Acid	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.287 U	0.3 U	0.294 U	0.336 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.574 U	0.599 U	0.587 U	0.672 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.287 U	0.3 U	0.294 U	0.336 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-15	EP-16	EP-17	EP-18
			Sample Date:	10/07/2022	10/07/2022	10/07/2022	12/08/2022
			Sample Depth (ft bls):	6 - 8	9 - 11	9 - 11	13 - 15
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.273 U	0.292 U	0.285 U	0.28 U
Perfluorobutanoic Acid	--	--	NG/G	0.025 J	0.584 UJ	0.57 UJ	0.56 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.273 UJ	0.292 U	0.285 U	0.28 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.273 UJ	0.292 UJ	0.285 UJ	0.28 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.273 U	0.292 U	0.285 U	0.28 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.546 UJ	0.584 UJ	0.57 UJ	0.56 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.273 UJ	0.292 UJ	0.285 U	0.28 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.273 U	0.292 U	0.285 U	0.28 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.273 UJ	0.292 UJ	0.285 U	0.28 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.546 UJ	0.584 U	0.57 U	0.56 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.546 U	0.584 U	0.57 U	0.56 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.273 UJ	0.292 UJ	0.285 U	0.28 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-19	EP-20	EP-21	EP-22
			Sample Date:	10/07/2022	10/25/2022	01/26/2023	01/26/2023
			Sample Depth (ft bls):	8 - 10	11 - 13	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.279 U	0.292 U	0.258 U	0.279 U
Perfluorobutanoic Acid	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.03 J
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.279 U	0.292 U	0.075 J	0.279 UJ
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.279 U	0.292 U	0.258 U	0.279 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.279 U	0.292 U	0.258 U	0.279 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 UJ
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.279 U	0.292 U	0.087 J	0.279 UJ
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.279 U	0.292 U	0.216 J	0.279 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.279 U	0.292 U	0.163 J	0.154 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 UJ
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.557 U	0.583 U	0.515 U	0.558 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.279 U	0.292 U	0.379 J	0.154 J

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-23	EP-25	EP-26	EP-28
			Sample Date:	01/26/2023	01/31/2023	01/26/2023	01/31/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	2 - 4
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.355 U	0.273 U	0.273 U	0.261 U
Perfluorobutanoic Acid	--	--	NG/G	0.082 J	0.546 U	0.546 U	0.521 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.355 U	0.273 U	0.273 U	0.261 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.067 J	0.273 U	0.273 U	0.261 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.355 U	0.273 U	0.273 U	0.261 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.355 U	0.273 U	0.273 U	0.261 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.355 U	0.273 U	0.273 U	0.261 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.339 J	0.452	0.273 U	0.064 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.083 J	0.546 U	0.546 U	0.521 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.71 U	0.546 U	0.546 U	0.521 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.339 J	0.452	0.273 U	0.064 J

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	EP-29	EP-30	EP-31	SW-1
			Sample Date:	01/31/2023	01/31/2023	01/31/2023	03/28/2023
			Sample Depth (ft bls):	2 - 4	2 - 4	2 - 4	7.5 - 9.5
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.281 U	0.267 U	0.266 U	0.313 U
Perfluorobutanoic Acid	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.281 U	0.267 U	0.266 U	0.313 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.281 U	0.267 U	0.266 U	0.313 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.281 U	0.267 U	0.266 U	0.313 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.281 U	0.267 U	0.266 U	0.181 J
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.281 U	0.267 U	0.266 U	0.313 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.281 U	0.267 U	0.266 U	0.074 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.562 U	0.533 U	0.532 U	0.626 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.281 U	0.267 U	0.266 U	0.074 J

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-2	SW-3	SW-4	SW-5
			Sample Date:	02/23/2023	02/24/2023	02/23/2023	02/23/2023
			Sample Depth (ft bls):	5.5 - 7.5	6.5 - 8.5	5 - 7	8 - 10
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.256 U	0.269 U	0.305 U	0.29 U
Perfluorobutanoic Acid	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.256 U	0.269 U	0.305 U	0.29 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.256 U	0.269 U	0.305 U	0.29 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.256 U	0.269 U	0.305 U	0.29 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.256 U	0.269 U	0.305 U	0.29 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.256 U	0.269 U	0.305 U	0.29 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.064 J	0.116 EMPC	0.051 J	0.049 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.513 U	0.539 U	0.61 U	0.58 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.513 U	0.198 J	0.61 U	0.58 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.064 J	0.116 J	0.051 J	0.049 J

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-6	SW-7	SW-8	SW-9
			Sample Date:	12/09/2022	12/09/2022	12/09/2022	12/21/2022
			Sample Depth (ft bls):	8 - 10	4 - 6	6.5 - 8.5	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.306 U	0.271 U	0.264 U	0.29 U
Perfluorobutanoic Acid	--	--	NG/G	0.093 J	0.543 U	0.529 U	0.58 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.306 U	0.271 U	0.264 U	0.29 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.306 U	0.271 U	0.264 U	0.29 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.306 U	0.271 U	0.264 U	0.29 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.306 U	0.271 U	0.264 U	0.29 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.306 U	0.271 U	0.264 U	0.29 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.306 U	0.271 U	0.049 J	0.103 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.612 U	0.543 U	0.529 U	0.58 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.306 U	0.271 U	0.049 J	0.103 J

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-10	SW-10	SW-11	SW-12
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	12/21/2022
			Sample Depth (ft bls):	14 - 16	14 - 16	15 - 17	15 - 17
			Normal Sample or Field Duplicate:	N	FD	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.551 U	0.558 U	0.135 EMPC	0.604 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.276 U	0.279 U	0.281 U	0.302 U
Perfluorobutanoic Acid	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.276 U	0.279 U	0.281 U	0.302 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.276 U	0.279 U	0.281 U	0.302 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.276 U	0.279 U	0.281 U	0.302 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.276 U	0.279 U	0.281 U	0.302 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.276 U	0.279 U	0.281 U	0.302 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.066 J	0.067 J	0.281 U	0.077 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.551 U	0.558 U	0.563 U	0.604 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.066 J	0.067 J	0.281 U	0.077 J

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-13	SW-14	SW-14	SW-15
			Sample Date:	12/21/2022	12/21/2022	01/06/2023	12/21/2022
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	14 - 16
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluorobutanoic Acid	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.288 U	0.288 U	0.289 U	0.267 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 UJ
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.577 U	0.575 U	0.577 U	0.534 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.288 U	0.288 U	0.289 U	0.267 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-16	SW-17	SW-18	SW-19
			Sample Date:	12/21/2022	12/21/2022	12/21/2022	03/15/2023
			Sample Depth (ft bls):	14 - 16	14 - 16	14 - 16	22 - 24
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 UJ
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluorobutanoic Acid	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.292 U	0.31 U	0.278 U	0.288 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.583 U	0.62 U	0.556 U	0.577 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.292 U	0.31 U	0.278 U	0.288 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-19-E	SW-19-N	SW-19S	SW-19W
			Sample Date:	03/15/2023	03/15/2023	03/15/2023	03/15/2023
			Sample Depth (ft bls):	16 - 18	16 - 18	16 - 18	16 - 18
			Normal Sample or Field Duplicate:	N	N	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units				
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.595 U	1.84 UJ	0.62 U	0.522 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluorobutanoic Acid	--	--	NG/G	0.595 U	1.84 UJ	0.62 U	0.522 U
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.595 U	1.84 UJ	0.62 U	0.522 U
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.595 U	0.564 U	0.62 U	0.522 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.595 U	1.84 UJ	0.62 U	0.522 U
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.595 U	1.84 UJ	0.62 U	0.522 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.595 U	1.84 U	0.62 U	0.522 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.298 U	0.922 UJ	0.31 U	0.261 U

Table 3f. Summary of Per- and Polyfluoroalkyl Substances in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

			Sample Designation:	SW-20	SW-21
			Sample Date:	01/06/2023	01/06/2023
			Sample Depth (ft bls):	13 - 15	13 - 15
			Normal Sample or Field Duplicate:	N	N
Parameter	**NYSDEC Part 375 Unrestricted Use GV**	NYSDEC Part 375 Restricted Residential GV	Units		
2-(N-methyl perfluorooctanesulfonamido) acetic acid	--	--	NG/G	0.545 U	0.586 U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	--	NG/G	0.545 U	0.586 U
Perfluorobutanesulfonic acid (PFBS)	--	--	NG/G	0.272 U	0.293 U
Perfluorobutanoic Acid	--	--	NG/G	0.545 U	0.586 UJ
Perfluorodecane Sulfonic Acid	--	--	NG/G	0.545 U	0.586 U
Perfluorodecanoic acid (PFDA)	--	--	NG/G	0.272 U	0.293 U
Perfluorododecanoic acid (PFDoA)	--	--	NG/G	0.545 U	0.586 U
Perfluoroheptane Sulfonate (PFHPS)	--	--	NG/G	0.545 U	0.586 U
Perfluoroheptanoic acid (PFHpA)	--	--	NG/G	0.272 U	0.293 UJ
Perfluorohexanesulfonic acid (PFHxS)	--	--	NG/G	0.272 U	0.293 U
Perfluorohexanoic acid (PFHxA)	--	--	NG/G	0.545 U	0.586 UJ
Perfluorononanoic acid (PFNA)	--	--	NG/G	0.272 U	0.293 UJ
Perfluorooctane Sulfonamide (FOSA)	--	--	NG/G	0.545 U	0.586 U
Perfluorooctanesulfonic acid (PFOS)	0.88	44	NG/G	0.272 U	0.293 U
Perfluorooctanoic acid (PFOA)	0.66	33	NG/G	0.272 U	0.088 J
Perfluoropentanoic Acid (PFPeA)	--	--	NG/G	0.545 U	0.586 UJ
Perfluorotetradecanoic acid (PFTA)	--	--	NG/G	0.545 U	0.586 U
Perfluorotridecanoic Acid (PFTriA)	--	--	NG/G	0.545 U	0.586 U
Perfluoroundecanoic Acid (PFUnA)	--	--	NG/G	0.545 U	0.586 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	--	--	NG/G	0.545 U	0.586 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	--	--	NG/G	0.545 U	0.586 U
TOTAL PFOA AND PFOS	--	--	NG/G	0.272 U	0.088 J

Table 3g. Summary of TCLP Metals in Final Endpoint Soil Samples, 2-33 50th Avenue, Long Island City, New York

		Sample Designation:	EP-8	EP-21	EP-22	EP-23	EP-28
		Sample Date:	10/20/2022	01/26/2023	01/26/2023	01/26/2023	03/17/2023
		Sample Depth (ft bls):	7 - 8	2 - 4	2 - 4	2 - 4	2 - 4
Parameter	**USEPA Regulatory Levels (mg/L)**	Units					
Lead	5	MG/L	0.103 J	0.0611 J	0.5 U	0.175 J	0.5 U

Table 3h. Summary of Volatile Organic Compounds in Groundwater, 2-33 50th Avenue, Long Island City, New York

			GW022223
		Sample Date:	02/22/2023
Parameter	**NYSDEC Ambient Water Quality Standards and Guidance Values**	Units	
1,1,1,2-Tetrachloroethane	5	UG/L	2.5 U
1,1,1-Trichloroethane (TCA)	5	UG/L	2.5 U
1,1,2,2-Tetrachloroethane	5	UG/L	0.5 U
1,1,2-Trichloroethane	1	UG/L	1.5 U
1,1-Dichloroethane	5	UG/L	2.5 U
1,1-Dichloroethene	5	UG/L	0.5 U
1,1-Dichloropropene	5	UG/L	2.5 U
1,2,3-Trichlorobenzene	5	UG/L	2.5 U
1,2,3-Trichloropropane	0.04	UG/L	2.5 U
1,2,4,5-Tetramethylbenzene	5	UG/L	0.68 J
1,2,4-Trichlorobenzene	5	UG/L	2.5 U
1,2,4-Trimethylbenzene	5	UG/L	0.7 J
1,2-Dibromo-3-Chloropropane	0.04	UG/L	2.5 U
1,2-Dibromoethane (Ethylene Dibromide)	0.0006	UG/L	2 U
1,2-Dichlorobenzene	3	UG/L	2.5 U
1,2-Dichloroethane	0.6	UG/L	0.5 U
1,2-Dichloropropane	1	UG/L	1 U
1,3,5-Trimethylbenzene (Mesitylene)	5	UG/L	2.5 U
1,3-Dichlorobenzene	3	UG/L	2.5 U
1,3-Dichloropropane	5	UG/L	2.5 U
1,4-Dichlorobenzene	3	UG/L	2.5 U
1,4-Diethyl Benzene	--	UG/L	2 U
1,4-Dioxane (P-Dioxane)	0.35	UG/L	250 R
2,2-Dichloropropane	5	UG/L	2.5 U
2-Chlorotoluene	5	UG/L	2.5 U
2-Hexanone	50	UG/L	5 U
4-Chlorotoluene	5	UG/L	2.5 U
4-Ethyltoluene	--	UG/L	2 U
Acetone	50	UG/L	16
Acrylonitrile	5	UG/L	5 U
Benzene	1	UG/L	**2.9**
Bromobenzene	5	UG/L	2.5 U
Bromochloromethane	5	UG/L	2.5 U

Table 3h. Summary of Volatile Organic Compounds in Groundwater, 2-33 50th Avenue, Long Island City, New York

			GW022223
		Sample Date:	02/22/2023
Parameter	**NYSDEC Ambient Water Quality Standards and Guidance Values**	Units	
Bromodichloromethane	50	UG/L	0.5 U
Bromoform	50	UG/L	2 U
Bromomethane	5	UG/L	2.5 U
Carbon Disulfide	60	UG/L	5 U
Carbon Tetrachloride	5	UG/L	0.5 U
Chlorobenzene	5	UG/L	2.5 U
Chloroethane	5	UG/L	2.5 U
Chloroform	7	UG/L	2.5 U
Chloromethane	5	UG/L	2.5 U
Cis-1,2-Dichloroethylene	5	UG/L	2.5 U
Cis-1,3-Dichloropropene	--	UG/L	0.5 U
Cymene	5	UG/L	1 J
Dibromochloromethane	50	UG/L	0.5 U
Dibromomethane	5	UG/L	5 U
Dichlorodifluoromethane	5	UG/L	5 U
Dichloroethylenes	5	UG/L	2.5 U
Diethyl Ether (Ethyl Ether)	--	UG/L	2.5 U
Ethylbenzene	5	UG/L	0.71 J
Hexachlorobutadiene	0.5	UG/L	2.5 U
Isopropylbenzene (Cumene)	5	UG/L	2.5 U
m,p-Xylene	5	UG/L	2.2 J
Methyl Ethyl Ketone (2-Butanone)	50	UG/L	5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	--	UG/L	5 U
Methylene Chloride	5	UG/L	2.5 U
Naphthalene	10	UG/L	6.3
N-Butylbenzene	5	UG/L	2.5 U
N-Propylbenzene	5	UG/L	2.5 U
O-Xylene (1,2-Dimethylbenzene)	5	UG/L	1.3 J
Sec-Butylbenzene	5	UG/L	2.5 U
Styrene	5	UG/L	2.5 U
T-Butylbenzene	5	UG/L	2.5 U
Tert-Butyl Methyl Ether	10	UG/L	2.5 U
Tetrachloroethylene (PCE)	5	UG/L	0.5 U

Table 3h. Summary of Volatile Organic Compounds in Groundwater, 2-33 50th Avenue, Long Island City, New York

			GW022223
		Sample Date:	02/22/2023
Parameter	**NYSDEC Ambient Water Quality Standards and Guidance Values**	Units	
Toluene	5	UG/L	1.1 J
Total, 1,3-Dichloropropene (Cis And Trans)	0.4	UG/L	0.5 U
Trans-1,2-Dichloroethene	5	UG/L	2.5 U
Trans-1,3-Dichloropropene	--	UG/L	0.5 U
Trans-1,4-Dichloro-2-Butene	5	UG/L	2.5 U
Trichloroethylene (TCE)	5	UG/L	0.5 U
Trichlorofluoromethane	5	UG/L	2.5 U
Vinyl Acetate	--	UG/L	5 U
Vinyl Chloride	2	UG/L	1 U
Xylenes	5	UG/L	3.5 J

Table 3i. Summary of Semivolatile Organic Compounds in Groundwater, 2-33 50th Avenue, Long Island City, New York

Parameter	NYSDEC Ambient Water Quality Standards and Guidance Values	Units	Sample Designation: GW022223 Sample Date: 02/22/2023
1,2,4,5-Tetrachlorobenzene	5	UG/L	10 U
1,2,4-Trichlorobenzene	5	UG/L	5 U
1,2-Dichlorobenzene	3	UG/L	2 U
1,3-Dichlorobenzene	3	UG/L	2 U
1,4-Dichlorobenzene	3	UG/L	2 U
2,4,5-Trichlorophenol	--	UG/L	5 U
2,4,6-Trichlorophenol	--	UG/L	5 U
2,4-Dichlorophenol	5	UG/L	5 U
2,4-Dimethylphenol	50	UG/L	5 U
2,4-Dinitrophenol	10	UG/L	20 U
2,4-Dinitrotoluene	5	UG/L	5 U
2,6-Dinitrotoluene	5	UG/L	5 U
2-Chloronaphthalene	10	UG/L	0.2 U
2-Chlorophenol	--	UG/L	2 U
2-Methylnaphthalene	--	UG/L	0.89
2-Methylphenol (O-Cresol)	--	UG/L	1.2 J
2-Nitroaniline	5	UG/L	5 U
2-Nitrophenol	--	UG/L	10 U
3,3'-Dichlorobenzidine	5	UG/L	5 U
3-Nitroaniline	5	UG/L	5 U
4,6-Dinitro-2-Methylphenol	--	UG/L	10 U
4-Bromophenyl Phenyl Ether	--	UG/L	2 U
4-Chloro-3-Methylphenol	--	UG/L	2 U
4-Chloroaniline	5	UG/L	5 U
4-Chlorophenyl Phenyl Ether	--	UG/L	2 U
4-Nitroaniline	5	UG/L	5 U
4-Nitrophenol	--	UG/L	10 U
Acenaphthene	20	UG/L	0.75
Acenaphthylene	20	UG/L	0.21
Acetophenone	--	UG/L	5 U
Anthracene	50	UG/L	0.22
Benzo(A)Anthracene	0.002	UG/L	**0.03 J**
Benzo(A)Pyrene	0	UG/L	0.1 U
Benzo(B)Fluoranthene	0.002	UG/L	**0.01 J**
Benzo(G,H,I)Perylene	--	UG/L	0.1 U

Table 3i. Summary of Semivolatile Organic Compounds in Groundwater, 2-33 50th Avenue, Long Island City, New York

		Sample Designation:	GW022223
		Sample Date:	02/22/2023
Parameter	**NYSDEC Ambient Water Quality Standards and Guidance Values**	Units	
Benzo(K)Fluoranthene	0.002	UG/L	0.1 U
Benzoic Acid	--	UG/L	7.6 J
Benzyl Alcohol	--	UG/L	2 U
Benzyl Butyl Phthalate	50	UG/L	5 U
Biphenyl (Diphenyl)	5	UG/L	2 U
Bis(2-Chloroethoxy) Methane	5	UG/L	5 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	1	UG/L	2 U
Bis(2-Chloroisopropyl) Ether	5	UG/L	2 U
Bis(2-Ethylhexyl) Phthalate	5	UG/L	3 U
Carbazole	--	UG/L	2 U
Chrysene	0.002	UG/L	**0.02 J**
Dibenz(A,H)Anthracene	--	UG/L	0.1 U
Dibenzofuran	--	UG/L	2 U
Diethyl Phthalate	50	UG/L	5 U
Dimethyl Phthalate	50	UG/L	5 U
Di-N-Butyl Phthalate	50	UG/L	5 U
Di-N-Octylphthalate	--	UG/L	5 U
Fluoranthene	50	UG/L	0.2
Fluorene	50	UG/L	0.54
Hexachlorobenzene	0.04	UG/L	0.8 U
Hexachlorobutadiene	0.5	UG/L	0.5 U
Hexachlorocyclopentadiene	5	UG/L	20 U
Hexachloroethane	5	UG/L	0.8 U
Indeno(1,2,3-C,D)Pyrene	0.002	UG/L	0.1 U
Isophorone	50	UG/L	5 U
M+P MethylPhenol	--	UG/L	1.5 J
Naphthalene	10	UG/L	4.4
Nitrobenzene	0.4	UG/L	2 U
N-Nitrosodi-N-Propylamine	--	UG/L	5 U
N-Nitrosodiphenylamine	50	UG/L	2 U
Phenanthrene	50	UG/L	0.67
Phenol	1	UG/L	0.96 J
Pyrene	50	UG/L	0.16

Notes Utilized Throughout Tables	
Soil Tables	
J -	Estimated value
J+ -	Estimated value, high bias
J- -	Estimated value, low bias
P -	The RPD between the results for the two columns exceeds the method-specified criteria
RPD -	Relative Percent Difference
R -	Sample results rejected by validator
U -	The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit
UJ -	Analyte was not detected. The associated reported quantitation limit is an estimate
ft bls -	Feet below land surface
FD -	Duplicate sample
NA -	Compound was not analyzed for by laboratory
mg/kg -	Milligrams per kilogram
ng/g -	Nanograms per gram
NYSDEC -	New York State Department of Environmental Conservation
SCO -	Soil Cleanup Objectives
--	No SCO available
Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use SCO	
Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential SCO	
Per- and Polyfluoroalkyl Substances (PFAS)	
GV -	Guidance Values
EMPC -	The results do not meet all criteria for a confirmed identification. The quantitative value represents the Estimated Maximum Possible Concentration of the analyte in the sample
Bold data indicates that parameter exceeded the NYSDEC Unrestricted Use Guidance Values	
Shaded data indicates that parameter exceeded the NYSDEC Restricted Residential Guidance Values	
TCLP Tables	
mg/L -	Milligrams per liter
USEPA -	United States Environmental Protection Agency
TCLP -	Toxicity Characteristic Leaching Procedure
USEPA Regulatory Levels - United States Environmental Protection	
	Agency Limits for RCRA Characteristic Waste for Toxicity
RCRA -	Resource Conservation and Recovery Act
Bold -	Parameter was detected above USEPA Regulatory Levels
Groundwater Tables	
J -	Estimated Value
U -	The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit
R -	Sample results rejected by validator
µg/L -	Micrograms per liter
NYSDEC -	New York State Department of Environmental Conservation
AWQSGVs -	Ambient Water-Quality Standards and Guidance Values
--	No NYSDEC AWQSGV available
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs	

Table 4. Post Remediation Sampling Requirements and Schedule, 2-33 50th Avenue, Long Island City, New York

	Analytical Parameters					
Sampling Location	VOCs (EPA Method 8260D)	SVOCs (EPA method 8270D)	Dissolved SVOCs	Total Metals (EPA Method 6020/Hg)	Dissolved Metals (EPA Method 6020/Hg)	**Schedule**
Monitoring Wells (GW-01 to GW-07)	X	X	X	X	X	Quarterly for four rounds

Table 5. Monitoring Well Construction Details, 2-33 50th Avenue, Long Island City, New York

Monitoring Well ID	Well Location	Coordinates (longitude/latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
				Casing	Surface	Screen Top	Screen Bottom
GW-01	Onsite/ Downgradient	40.743991 -73.957744	2	6.83	7.08	1.08	-8.92
GW-02	Onsite/ Downgradient	40.743898 -73.957779	2	6.83	7.08	1.08	-8.92
GW-03	Downgradient	40.744005 -73.957417	2	7.25	7.5	1.5	-8.5
GW-04	Upgradient	40.743593 -73.956382	2	9.23	9.48	3.48	-6.52
GW-05	Upgradient	40.743317 -73.956462	2	9.29	9.54	3.54	-6.46
GW-06	Downgradient	40.743346 -73.956982	2	8.83	9.08	3.08	-6.92
GW-07	Downgradient	40.743522 -73.957936	2	6.91	7.16	1.16	-8.84

Table 6. Schedule of Interim Monitoring/Inspection Reports, 2-33 50th Avenue, Long Island City, New York

Task/Report	Reporting Frequency*
Inspection Report	Annually or as otherwise determined by the Department
Periodic Review Report	First report 30 days after the end of each certification period. First report will be submitted after the first 16-month certification period, then annually until completion and documentation of all development-related construction, then every 3 years thereafter or as otherwise determined by the NYSDEC.
SVI Evaluation	Upon change of use/occupancy of a previously unoccupied building or initial occupancy of a new building. Following any changes or major repairs to the Site Cover system

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

Table 7. Tracks 1 and 4 Soil Cleanup Objectives, 2-33 50th Avenue, Long Island City, New York

Parameter	Soil Cleanup Objectives*	Soil Cleanup Objectives**
Volatile Organic Compounds (Concentrations in mg/kg)		
1,1,1-Trichloroethane	0.68	100
1,1-Dichloroethane	0.27	26
1,1-Dichloroethene	0.33	100
1,2,4-Trimethylbenzene	3.6	52
1,3,5-Trimethylbenzene	8.4	52
1,2-Dichlorobenzene	1.1	100
1,2-Dichloroethane	0.02	3.1
1,3-Dichlorobenzene	2.4	49
1,4-Dichlorobenzene	1.8	13
1,4-Dioxane	0.1	13
2-Butanone (MEK)	0.12	100
Acetone	0.05	100
Benzene	0.06	4.8
n-Butylbenzene	12	100
Carbon tetrachloride	0.76	2.4
Chlorobenzene	1.1	100
Chloroform	0.37	49
cis-1,2-Dichloroethene	0.25	100
Ethylbenzene	1	41
Methylene chloride	0.05	100
MTBE	0.93	100
n-Propylbenzene	3.9	100
sec-Butylbenzene	11	100
tert-Butylbenzene	5.9	100
Tetrachloroethene	1.3	19
Toluene	0.7	100
trans-1,2-Dichloroethene	0.19	100
Trichloroethene	0.47	21
Vinyl chloride	0.02	0.9
Xylenes (total)	0.26	100
Semivolatile Organic Compounds (Concentrations in mg/kg)		
1,4-Dioxane	0.1	13
2-Methylphenol	0.33	100
3&4-Methylphenol	0.33	100
Acenaphthene	20	100
Acenaphthylene	100	100
Anthracene	100	100
Benzo[a]anthracene	1	1
Benzo[a]pyrene	1	1
Benzo[b]fluoranthene	1	1
Benzo[g,h,i]perylene	100	100
Benzo[k]fluoranthene	0.8	3.9
Chrysene	1	3.9
Dibenzo[a,h]anthracene	0.33	0.33
Dibenzofuran	7	59
Fluoranthene	100	100
Fluorene	30	100
Hexachlorobenzene	0.33	1.2
Indeno[1,2,3-cd]pyrene	0.5	0.5
Naphthalene	12	100
Pentachlorophenol	0.8	6.7
Phenanthrene	100	100
Phenol	0.33	100
Pyrene	100	100

Table 7. Tracks 1 and 4 Soil Cleanup Objectives, 2-33 50th Avenue, Long Island City, New York

Parameter	Soil Cleanup Objectives*	Soil Cleanup Objectives**
Metals (Concentrations in mg/kg)		
Arsenic	13	16
Barium	350	400
Beryllium	7.2	72
Cadmium	2.5	4.3
Chromium, Hexavalent	1	110
Chromium	30	180
Copper	50	270
Cyanide, Total	27	27
Lead	63	400
Manganese	1600	2000
Mercury	0.18	0.81
Nickel	30	310
Selenium	3.9	180
Silver	2	180
Zinc	109	10000
Pesticides (Concentrations in mg/kg)		
2,4,5-TP	3.8	100
4,4'-DDD	0.0033	13
4,4'-DDE	0.0033	8.9
4,4'-DDT	0.0033	7.9
Aldrin	0.005	0.097
alpha-BHC	0.02	0.48
alpha-Chlordane	0.094	4.2
beta-BHC	0.036	0.36
delta-BHC	0.04	100
Dieldrin	0.005	0.2
Endosulfan I	2.4	24
Endosulfan II	2.4	24
Endosulfan sulfate	2.4	24
Endrin	0.014	11
gamma-BHC (Lindane)	0.1	1.3
Heptachlor	0.042	2.1
Pentachlorophenol	0.8	0.0067
Total Polychlorinated Biphenyls (Concentrations in mg/kg)		
Total Polychlorinated Biphenyls	0.1	1

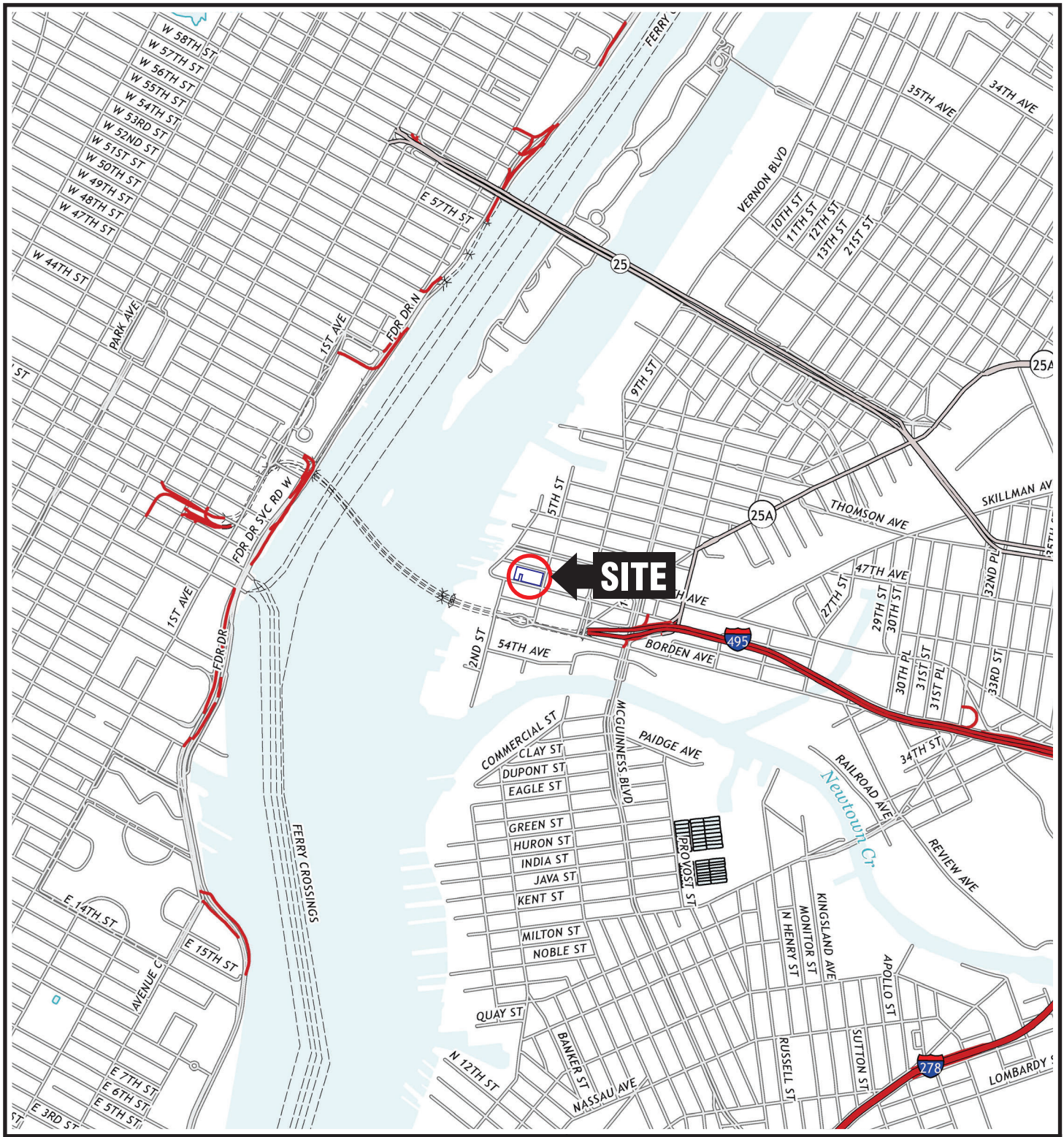
* Soil cleanup objectives for the Track 1 remedy are the NYSDEC Part 375 Unrestricted Residential Use SCOs.

** Soil cleanup objectives for theTracks 4 remedy are the NYSDEC Part 375 Restricted Residential Use SCOs.
µg/kg - Micrograms per kilogram
mg/kg - Milligrams per kilogram

NYSDEC - New York State Department of Environmental Conservation
SCOs - Soil Cleanup Objectives

FIGURES

1. Site Location Map
2. Site Layout Map
3. Geologic Cross Section
4. Groundwater Contour Map
5. Engineering Controls Location
6. Remaining Soil and Groundwater Sample Exceedances
7. Institutional Control Boundaries
8. Groundwater Monitoring Points



QUADRANGLE LOCATION

SOURCE:
USGS; Brooklyn, NY (2013),
USGS; Central Park, NY-NJ (2013),
USGS; Weehawken, NJ-NY (2011),
USGS; Jersey City, NJ-NY (2011)
7.5 Minute Topographic Quadrangles

N

0 2000'

Title:

SITE LOCATION MAP

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50th & 5th LIC LLC

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: A.I.	Date: 18JUL23	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	1
Project Mgr.: A.P.	Project No.: 2887.0004Y000	
File: 2887.0004Y158.07.CDR		

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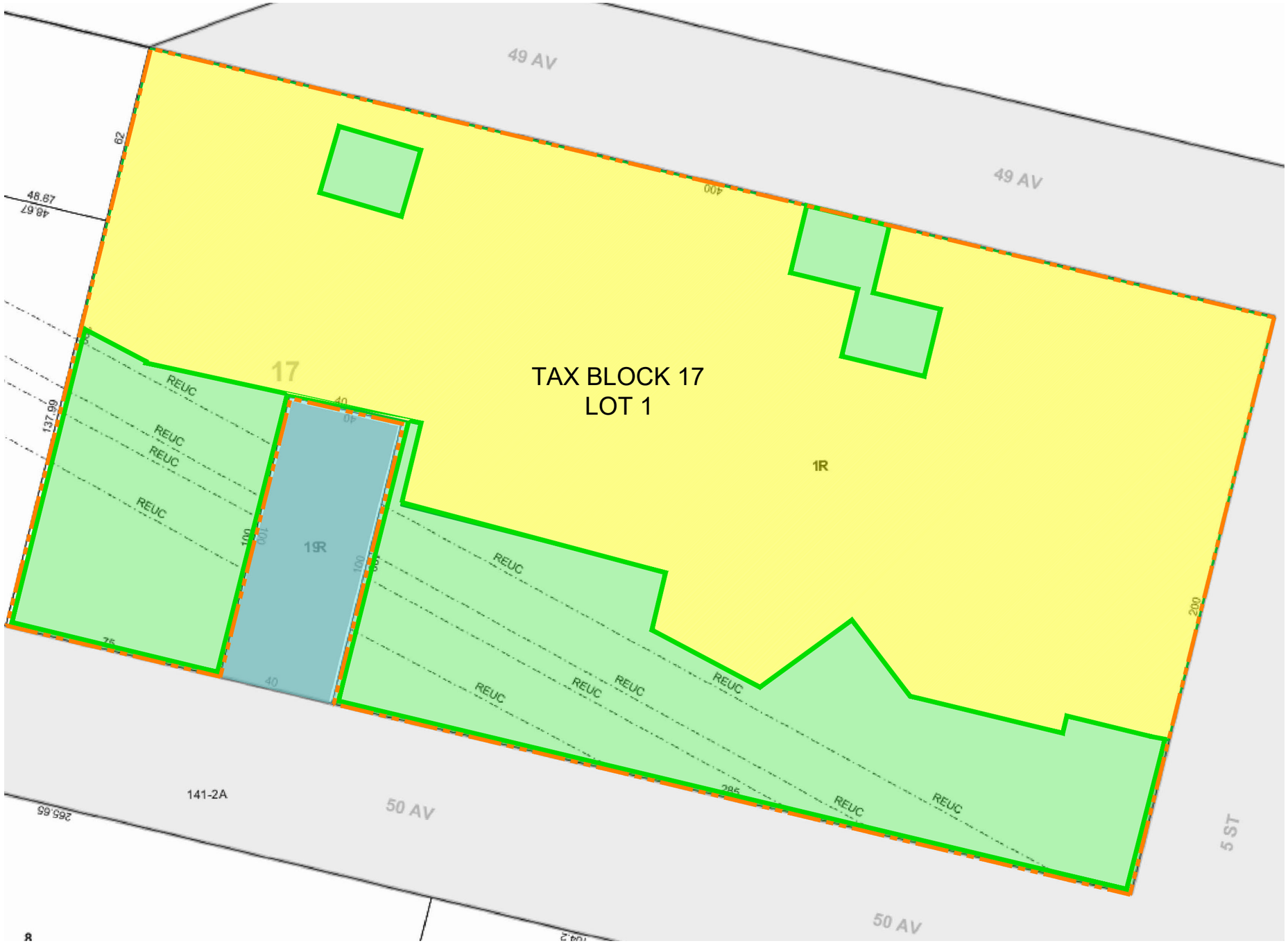

LEGEND

- BCP SITE BOUNDARY
- TRACK 4 AREA BOUNDARY
- LOT NOT PART OF THE BCP SITE
- CONDITIONAL TRACK 1 AREA
- TRACK 4 AREA

BCP – BROWNFIELD CLEANUP PROGRAM

N

Title:

SITE LAYOUT MAP

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50th & 5th LIC LLC

ROUX

Compiled by: A.I.	Date: 27DEC23	FIGURE
Prepared by: B.H.C.	Scale: NOT TO SCALE	2
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y158.01.DWG		

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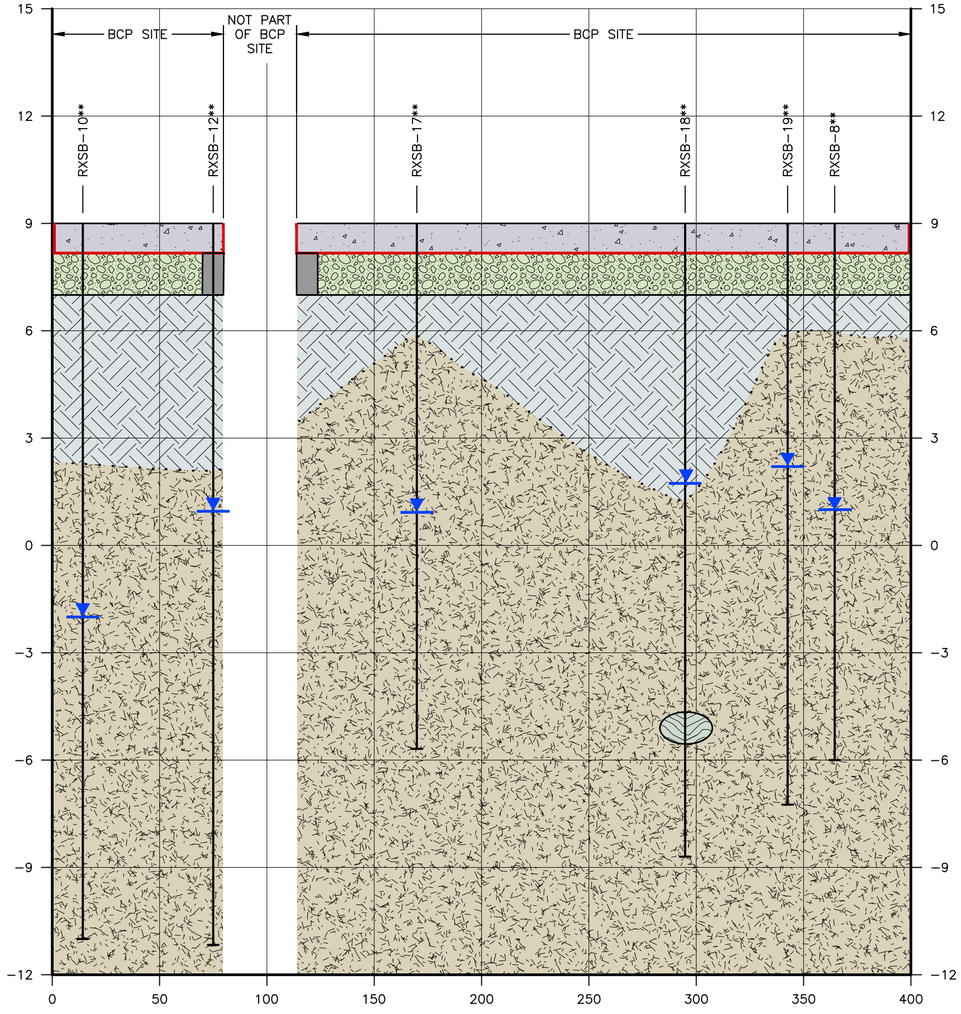
A

A'



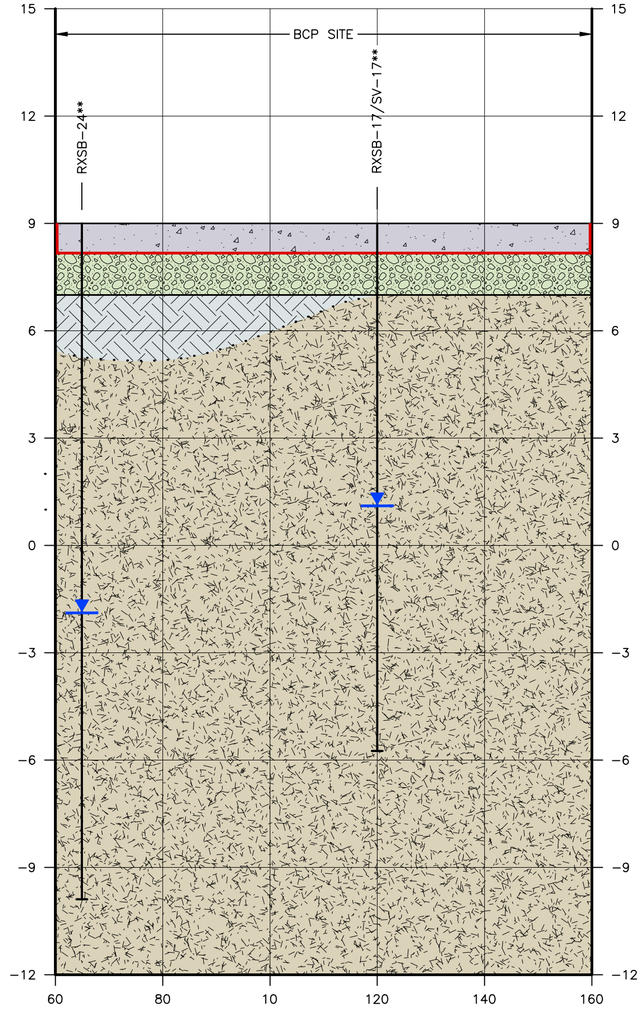
CROSS SECTION A–A'

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 3'

50' 0 50'

B

B'



CROSS SECTION B–B'

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 3'

20' 0 20'

LEGEND

- URBAN FILL PRIMARILY CONSISTING OF SAND, SILT, GRAVEL, BRICK, CONCRETE, GLASS AND WOOD
- SAND WITH VARYING AMOUNTS OF SILT AND CLAY
- PEAT
- CONCRETE SLAB ON GRADE
- AREA EXCAVATED AND BACKFILLED WITH NYSDEC–APPROVED CLEAN STONE OR BACKFILL
- AREA EXCAVATED AND BACKFILLED WITH CONCRETE SLAB
- VAPOR BARRIER
- GROUNDWATER ELEVATION

RXSB–10 — SOIL BORING ID

SOIL BORING

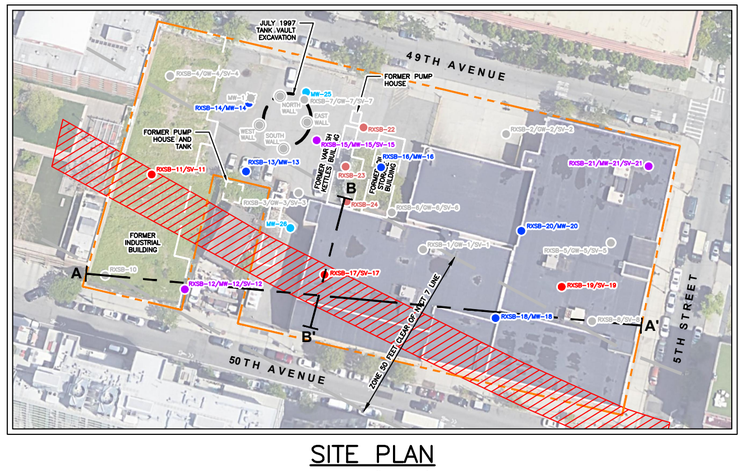
BOTTOM OF SOIL BORING

NOTES

* PHASE II SOIL BORINGS (RXSB–3/GW–3/SV–13, RXSB–5/GW–5/SV–5 AND RXSB–6/GW–6/SV–6) WERE NOT SURVEYED AND THEREFORE THEIR GROUND SURFACE ELEVATIONS ARE INFERRED BASED ON SURROUNDING REMEDIAL INVESTIGATION BORINGS

** SOIL BORINGS DESTROYED DURING REMEDIAL EZXCAVATION

1. NAVD88 – NORTH AMERICAN VERTICAL DATUM OF 1988
2. GROUNDWATER ELEVATIONS MEASURED ON AUGUST 6, 2021.
3. DOTTED LINES INDICATE APPROXIMATE LITHOLOGIC BOUNDARIES.



SITE PLAN

SCALE: 1" = 80'

Title:

GENERALIZED HYDROGEOLOGIC CROSS SECTIONS A-A' AND B-B'

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50th & 5th LIC LLC

ROUX

Compiled by: A.I.	Date: 18JUL23	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	3
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y158.04.DWG		

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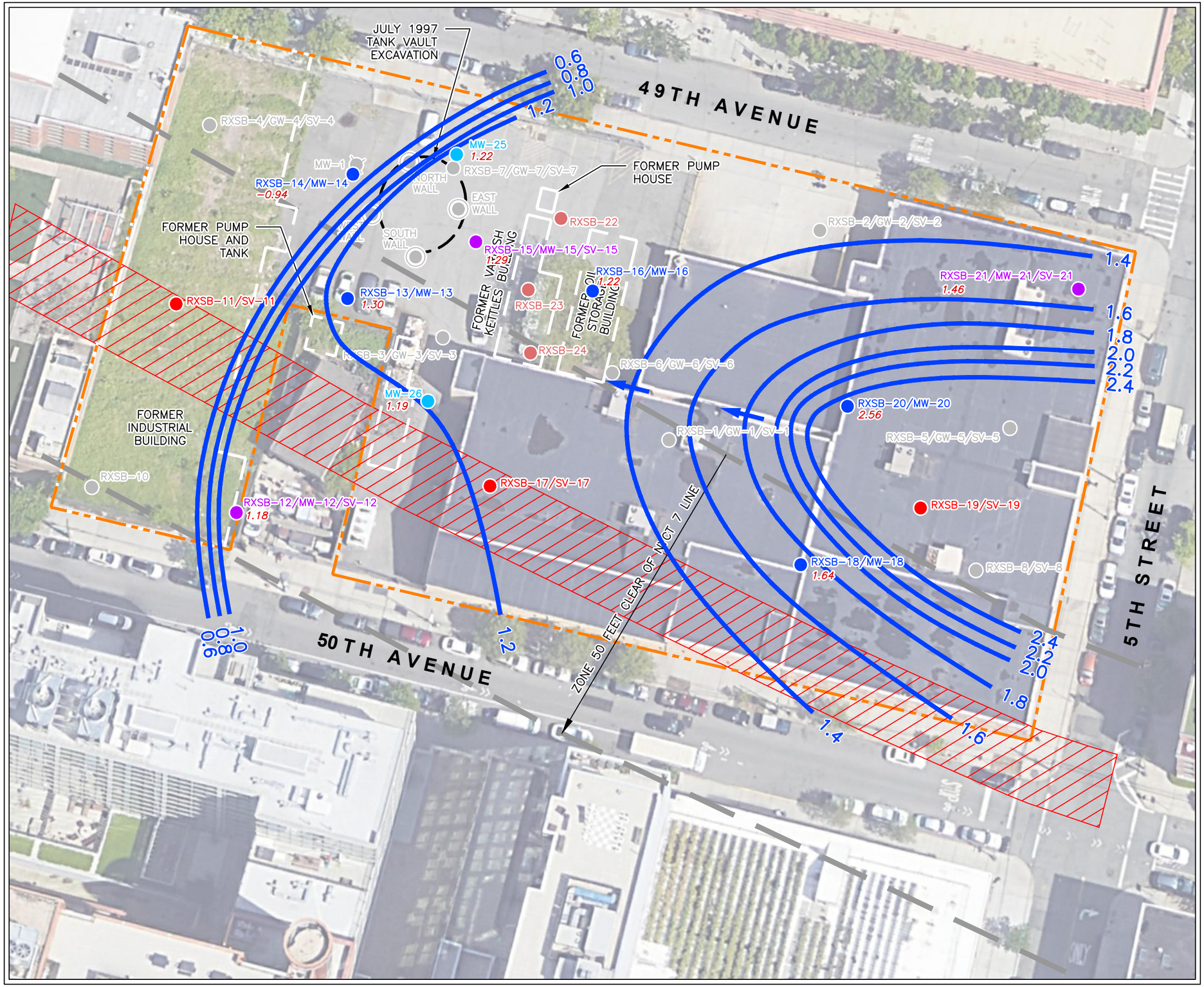

LEGEND

- SITE BOUNDARY
- RXSB-24 — SOIL BORING LOCATION AND DESIGNATION
- MW-26 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- RXSB-18/MW-18 — SOIL BORING AND GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- RXSB-11/SV-11 — SOIL BORING AND SOIL VAPOR LOCATION AND DESIGNATION
- RXSB-21/MW-21/SV-21 — SOIL BORING, GROUNDWATER MONITORING WELL AND SOIL VAPOR LOCATION AND DESIGNATION
- RXSB-5/GW-5/SV-5 — ROUX 2020 PHASE II SOIL BORING/ TEMPORARY GROUNDWATER WELL/SOIL VAPOR POINT LOCATION AND DESIGNATION
- NORTH WALL — IMPACT 1997 CAP TANK VAULT EXCAVATION SIDEWALL SOIL ENDPOINT LOCATION AND DESIGNATION
- MW-1 — IMPACT 1997 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (DESTROYED)
- NYCT 7 SUBWAY LINE TUNNEL
- 1.18 — GROUNDWATER ELEVATION IN FEET (NAVD88)
- 1.2 — GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION

N

40’ 0 40’

Title:

GROUNDWATER CONTOURS AUGUST 6, 2021

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50th & 5th LIC LLC

ROUX

Compiled by: A.I.	Date: 18JUL23	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	4
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y158.06.DWG		

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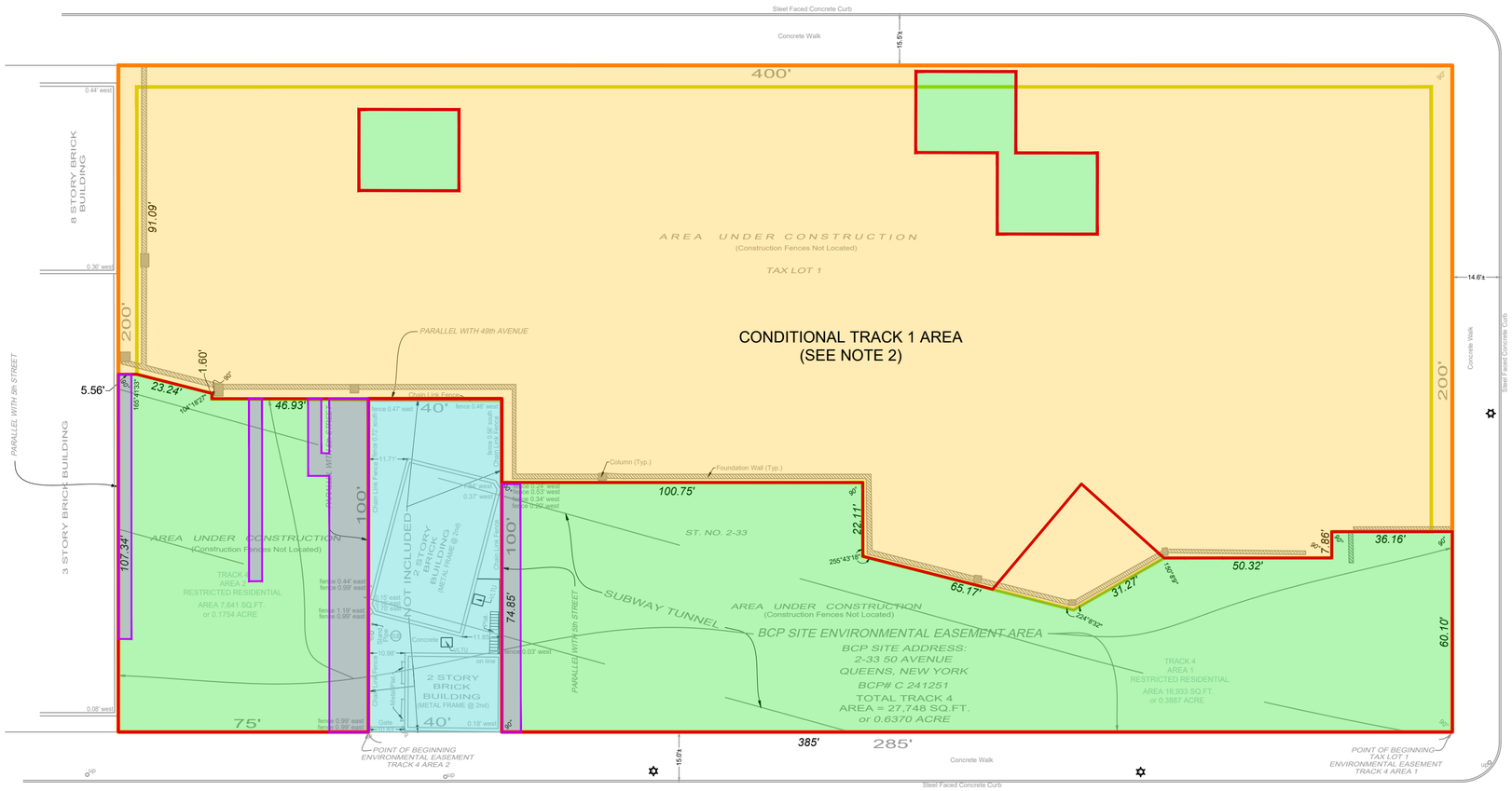


LEGEND

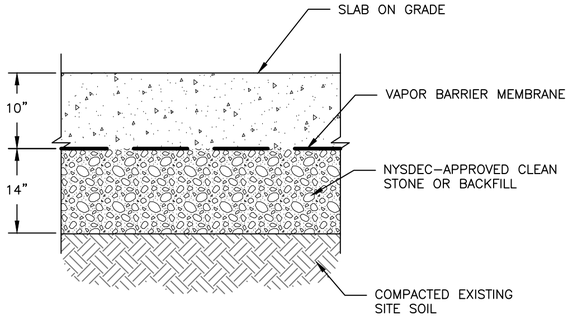
- BCP SITE BOUNDARY
- CELLAR
- LOT NOT PART OF THE BCP SITE
- TRACK 4 AREA
- DETAIL 1
- DETAIL 2
- DETAIL 3

BCP – BROWNFIELD CLEANUP PROGRAM

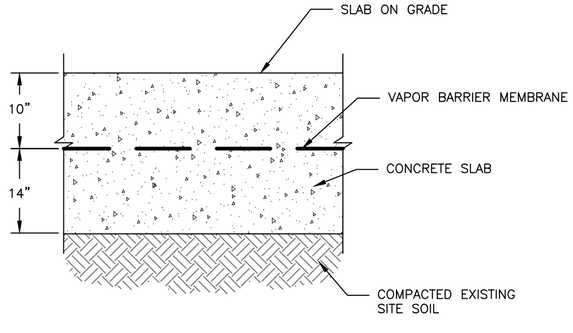
NYSDEC – NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NOTE

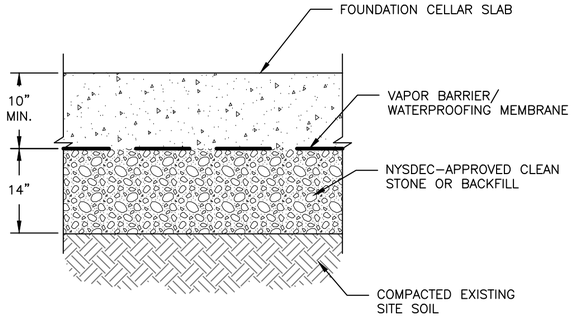
1. BASEMAP ADAPTED FROM ENVIRONMENTAL EASEMENT SURVEY BY MONTROSE SURVEYING CO. LLP, 05-17-23.
2. CONSTRUCTION OF THE CONDITIONAL TRACK 1 AREA CONCRETE SLAB IS CONSISTENT WITH DETAIL 3.



DETAIL 1
SITE COVER SYSTEM: CONCRETE SLAB ON GRADE ALTERNATE 1
SCALE: NOT TO SCALE



DETAIL 2
SITE COVER SYSTEM: CONCRETE SLAB ON GRADE ALTERNATE 2
SCALE: NOT TO SCALE



DETAIL 3
SITE COVER SYSTEM: CONCRETE SLAB FOUNDATION
SCALE: NOT TO SCALE

N

Title:

ENGINEERING CONTROLS LOCATION

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50TH & 5TH LIC LLC

ROUX

Compiled by: A.I.	Date: 27DEC23	FIGURE 5
Prepared by: B.H.C.	Scale: NOT TO SCALE	
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y158.03.DWG		

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SW-1	03/28/2023
Depth (ft bls)	7.5
VOCs	
Acetone	**0.073**
SVOCs	
Benzo(A)Anthracene	**1.5**
Benzo(A)Pyrene	**1.5**
Benzo(B)Fluoranthene	**1.8**
Chrysene	**1.6**
Indeno(1,2,3-C,D)Pyrene	**0.82**
PCBs	
Polychlorinated Biphenyl (PCBs)	**0.138**

GW022223	02/22/2023
VOCs	
Benzene	**2.9**
SVOCs	
Benzo(A)Anthracene	**0.03 J**
Benzo(B)Fluoranthene	**0.01 J**
Chrysene	**0.02 J**

SW-3	02/24/2023
Depth (ft bls)	6.5
SVOCs	
Benzo(A)Anthracene	**2.3**
Benzo(A)Pyrene	**2**
Benzo(B)Fluoranthene	**2.5**
Chrysene	**1.9**
Indeno(1,2,3-C,D)Pyrene	**1**
Metals	
Lead	**71.8**
Mercury	**1.68**

EP-4	11/29/2022	02/08/2023	02/09/2023
Depth (ft bls)	9 - 11	15 - 16	16 - 18
VOCs			
Acetone	0.018	0.038	**0.091**
Benzene	**0.22**	**0.07**	0.0096

SW-4	02/23/2023
Depth (ft bls)	5
Metals	
Mercury	**6.47**

SW-10	12/21/2022	12/21/2022
Depth (ft bls)	14 - 16	14 - 16 DUP
SVOCs		
Benzo(A)Anthracene	0.22	**4.4**
Benzo(A)Pyrene	0.2	**4.5**
Benzo(B)Fluoranthene	0.24	**5.9**
Benzo(K)Fluoranthene	0.065 J	**1.1**
Chrysene	0.18	**4.2**
Dibenz(A,H)Anthracene	0.027 J	**0.66**
Indeno(1,2,3-C,D)Pyrene	0.12 J	**3**
Metals		
Lead	40 J	**171 J**
Mercury	0.086 J	**0.343 J**

EP-11	11/08/2022
Depth (ft bls)	15
SVOCs	
Indeno(1,2,3-C,D)Pyrene	**0.57**

SW-5	02/23/2023
Depth (ft bls)	8
VOCs	
Acetone	**0.091**
Metals	
Lead	**85.2**
Mercury	**0.698**

EP-18	12/08/2022
Depth (ft bls)	13
VOCs	
Acetone	**0.43 J**

SW-7	12/09/2022
Depth (ft bls)	4
SVOCs	
Benzo(A)Anthracene	**19**
Benzo(A)Pyrene	**18**
Benzo(B)Fluoranthene	**20**
Benzo(K)Fluoranthene	**3.6**
Chrysene	**17**
Dibenz(A,H)Anthracene	**2.9**
Indeno(1,2,3-C,D)Pyrene	**8.2**
Metals	
Copper	**55.3**
Lead	**286**
Mercury	**0.384**
Zinc	**229**

EP-31	01/31/2023
Depth (ft bls)	2
VOCs	
Acetone	**0.082**
SVOCs	
Benzo(A)Anthracene	**1.2**
Benzo(B)Fluoranthene	**1.2**
Chrysene	**1.1**
Indeno(1,2,3-C,D)Pyrene	**0.63**
Metals	
Copper	**75.6**
Lead	**358**
Mercury	**0.45**
Zinc	**137**

EP-29	01/31/2023
Depth (ft bls)	2
VOCs	
Acetone	**0.11**
Metals	
Lead	**126**

EP-21	01/26/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**1.2**
Benzo(A)Pyrene	**1.2**
Benzo(B)Fluoranthene	**1.4**
Chrysene	**1.2**
Indeno(1,2,3-C,D)Pyrene	**0.64**
Metals	
Lead	**392**
Mercury	**6.27**

EP-22	01/26/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**2.8**
Benzo(A)Pyrene	**2.9**
Benzo(B)Fluoranthene	**3.3**
Benzo(K)Fluoranthene	**1.1**
Chrysene	**3**
Dibenz(A,H)Anthracene	**0.45**
Indeno(1,2,3-C,D)Pyrene	**1.5**
Metals	
Copper	**83.9**
Lead	**441**
Mercury	**1.19**
Zinc	**200**

EP-23	01/26/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**4.2**
Benzo(A)Pyrene	**4.2**
Benzo(B)Fluoranthene	**5.4**
Chrysene	**4**
Dibenz(A,H)Anthracene	**0.74**
Indeno(1,2,3-C,D)Pyrene	**2.5**
Metals	
Arsenic	**20.4**
Copper	**479**
Lead	**634**
Manganese	**2480**
Mercury	**1.66**
Zinc	**247**
PCBs	
Polychlorinated Biphenyl (PCBs)	
PFAS	

EP-24	02/06/2023	2 DUP
Depth (ft bls)	2	
SVOCs		
Benzo(A)Anthracene	NE	**1.2**
Benzo(A)Pyrene	**1.4**	**3.4**
Benzo(B)Fluoranthene	**1.5**	**3.5**
Benzo(K)Fluoranthene	NE	**0.83**
Chrysene	NE	**1.3**
Dibenz(A,H)Anthracene	NE	**0.42**
Indeno(1,2,3-C,D)Pyrene	**1**	**2.4**
Metals		
Lead	NE	**70.2**

EP-25	01/31/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**2.4**
Benzo(A)Pyrene	**2.4**
Benzo(B)Fluoranthene	**2.8**
Benzo(K)Fluoranthene	**0.84**
Chrysene	**2.1**
Dibenz(A,H)Anthracene	**0.34**
Indeno(1,2,3-C,D)Pyrene	**1.4**
Metals	
Chromium, Hexavalent	**1.14**
Lead	**290**
Mercury	**4.98**
Zinc	**371**

EP-26	01/26/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**1.4**
Benzo(A)Pyrene	**1.4**
Benzo(B)Fluoranthene	**1.5**
Chrysene	**1.4**
Indeno(1,2,3-C,D)Pyrene	**0.9**
Metals	
Chromium, Hexavalent	**1.13**
Lead	**230**
Mercury	**5.08**
Zinc	**132**

EP-27	02/06/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**2.4**
Benzo(A)Pyrene	**2.4**
Benzo(B)Fluoranthene	**2.9**
Chrysene	**2.3**
Indeno(1,2,3-C,D)Pyrene	**1.6**
Metals	
Copper	**65.6**
Lead	**294**
Mercury	**11**
Zinc	**134**

SW-6	12/09/2022
Depth (ft bls)	8
VOCs	
Acetone	**0.49**

EP-28	01/31/2023
Depth (ft bls)	2
SVOCs	
Benzo(A)Anthracene	**17**
Benzo(A)Pyrene	**18**
Benzo(B)Fluoranthene	**20**
Benzo(K)Fluoranthene	**5.6**
Chrysene	**17**
Dibenz(A,H)Anthracene	**2**
Indeno(1,2,3-C,D)Pyrene	**10**
Metals	
Copper	**142**
Lead	**977**
Mercury	**1.28**
Zinc	**1810**

EP-30	01/31/2023
Depth (ft bls)	2
VOCs	
Acetone	**0.17**
SVOCs	
Benzo(A)Anthracene	**5.4**
Benzo(A)Pyrene	**5.3**
Benzo(B)Fluoranthene	**6.2**
Benzo(K)Fluoranthene	**2**
Chrysene	**5.4**
Dibenz(A,H)Anthracene	**0.75 J**
Indeno(1,2,3-C,D)Pyrene	**3**
Metals	
Copper	**81.2**
Lead	**310**
Mercury	**0.288**
Zinc	**203**

GROUNDWATER

Parameter	NYSDEC AWQSGV	Units
VOCs		
Benzene	**1**	µg/L
SVOCs		
Benzo(B)Anthracene	**0.002**	µg/L
Benzo(B)Fluoranthene	**0.002**	µg/L
Chrysene	**0.002**	µg/L

µg/L – MICROGRAMS PER LITER

NYSDEC – NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AWQSGVS – AMBIENT WATER–QUALITY STANDARDS AND GUIDANCE VALUES

J – ESTIMATED VALUE

VOCS – VOLATILE ORGANIC COMPOUNDS

SVOCS – SEMIVOLATILE ORGANIC COMPOUNDS

SOIL

Parameter	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Residential Soil Cleanup Objectives	Units
VOCs			
Acetone	**0.05**	100	mg/kg
SVOCs			
Benzo(A)Anthracene	**1**	1	mg/kg
Benzo(A)Pyrene	**1**	1	mg/kg
Benzo(B)Fluoranthene	**1**	1	mg/kg
Benzo(K)Fluoranthene	**0.8**	3.9	mg/kg
Chrysene	**1**	3.9	mg/kg
Dibenz(A,H)Anthracene	**0.33**	0.33	mg/kg
Indeno(1,2,3-C,D)Pyrene	**0.5**	0.5	mg/kg
Metals			
Arsenic	**13**	16	mg/kg
Chromium, Hexavalent	**1**	110	mg/kg
Copper	**50**	270	mg/kg
Lead	**63**	400	mg/kg
Manganese	**1600**	2000	mg/kg
Mercury	**0.18**	0.81	mg/kg
Zinc	**109**	10000	mg/kg
PCBs			
Polychlorinated Biphenyl (PCBs)	**0.1**	1	mg/kg
Pesticides	NE	NE	mg/kg
PFAS	NE	NE	ng/g

mg/kg – MILLIGRAMS PER KILOGRAM

ng/g – NANOGRAMS PER GRAM

NYSDEC – NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

J – ESTIMATED VALUE

DUP – DUPLICATE SAMPLE

VOCs – VOLATILE ORGANIC COMPOUNDS

SVOCs – SEMIVOLATILE ORGANIC COMPOUNDS

PCBs – POLYCHLORINATED BIPHENYLS

PFAs – PER–AND POLYFLUOROALKYL SUBSTANCES

NE – NO EXCEEDANCE

FT BLS – FEET BELOW LAND SURFACE

30' 0 30'

LEGEND

EP-31 ENDPOINT SAMPLE LOCATION

SW-8 SIDEWALL SAMPLE LOCATION

SW-20 OVER EXCAVATION SW SAMPLES

SITE BOUNDARY

NYCT 7 SUBWAY LINE TUNNEL

CONDITIONAL TRACK 1 AREA

TRACK 4 AREA BOUNDARY

REMAINING STABILIZED LEAD

LIMITS OF TRACK 4 EXCAVATION TO 2 FEET

LIMITS OF TRACK 4 EXCAVATION TO 6 FEET

LIMITS OF TRACK 4 EXCAVATION TO 8 FEET

LIMITS OF TRACK 4 EXCAVATION TO 9 FEET

LIMITS OF TRACK 1 EXCAVATION TO 10 FEET

LIMITS OF TRACK 1 EXCAVATION TO 11 FEET

LIMITS OF TRACK 1 EXCAVATION TO 13 FEET

LIMITS OF TRACK 1 EXCAVATION TO 14 FEET

LIMITS OF TRACK 1 EXCAVATION TO 15 FEET

LIMITS OF TRACK 1 EXCAVATION TO 16 FEET

LIMITS OF TRACK 1 EXCAVATION TO 22 FEET

NOTES

1. REMEDIAL EXCAVATION IN CONDITIONAL TRACK 1 AREA (NORTHERN CELLAR PORTION OF THE BUILDING) AND TRACK 4 AREA (SOUTHERN SLAB ON GRADE AREA OF THE BUILDING)
2. CONSTRUCTION EXCAVATION OF SOUTHERN SLAB ON GRADE AREA IS APPROXIMATELY 2 FT BELOW GRADE.
3. GROUNDWATER (GW) MONITORING WELL (MW) WAS INSTALLED TEMPORARILY AND IS NO LONGER PRESENT ONSITE.

N

Title:

EXCEEDANCES OF UNRESTRICTED RESIDENTIAL AND RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVES

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50TH & 5TH LIC LLC

ROUX

Compiled by: A.I.	Date: 18SEP23	FIGURE
Prepared by: B.H.C.	Scale: AS SHOWN	6
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y159.03.DWG		

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Steel Faced Concrete Curb

Concrete Walk

15.5'±

400'

90°

0.44' west

8 STORY BRICK BUILDING

91.09'

0.36' west

AREA UNDER CONSTRUCTION
(Construction Fences Not Located)

TAX LOT 1

14.6'±

200'

Concrete Walk

Steel Faced Concrete Curb

5th (WEST AVENUE) STREET

60' WIDE

PARALLEL WITH 49th AVENUE

1.60'

5.56'

PARALLEL WITH 5th STREET

3 STORY BRICK BUILDING

23.24'

165°44'33"

104°18'27"

46.93'

PARALLEL WITH 5th STREET

Chain Link Fence

40'

fence 0.47' east

fence 0.46' west

fence 0.72' south

fence 0.56' south

Chain Link Fence

Chain Link Fence

11.71'

Column (Typ.)

Foundation Wall (Typ.)

1.84' west

0.37' west

fence 0.24' west
fence 0.23' west
fence 0.34' west
fence 0.20' west

100.75'

90°

22.11'

ST. NO: 2-33

100'

107.34'

AREA UNDER CONSTRUCTION
(Construction Fences Not Located)

NOT INCLUDED
2 STORY BRICK BUILDING
(METAL FRAME @ 2nd)

255°43'18"

SUBWAY TUNNEL

65.17'

50.32'

31.21'

224°16'32"

7.86'

36.16'

90°

fence 0.44' east
fence 0.99' east

fence 1.19' east
fence 0.99' east

0.15' east
0.18' east
1.70' east

Chain Link Fence

Plat.

VLTU

Concrete

11.85'

74.85'

PARALLEL WITH 5th STREET

BCP SITE ENVIRONMENTAL EASEMENT AREA
BCP SITE ADDRESS:
2-33 50 AVENUE
QUEENS, NEW YORK
BCP# C 241251
TOTAL TRACK 4
AREA = 27,748 SQ.FT
or 0.6370 ACRE

60.10'

fence 0.03' west

10.98'

on line

2 STORY BRICK BUILDING
(METAL FRAME @ 2nd)

Chain Link Fence

Metal Plat.

Gate

10.83'

0.08' west

75'

fence 0.99' east
fence 0.99' east

40'

0.18' west

POINT OF BEGINNING
ENVIRONMENTAL EASEMENT
TRACK 4 AREA 2

385'

285'

15.0'±

Concrete Walk

POINT OF BEGINNING
TAX LOT 1
ENVIRONMENTAL EASEMENT
TRACK 4 AREA 1

Steel Faced Concrete Curb

up

LEGEND

- BCP SITE AND INSTITUTIONAL CONTROL BOUNDARY
- LOT NOT PART OF THE BCP SITE
- CONDITIONAL TRACK 1
- TRACK 4 AREA

BCP – BROWNFIELD CLEANUP PROGRAM

NOTES

1. BASEMAP ADAPTED FROM ENVIRONMENTAL EASEMENT SURVEY BY MONTROSE SURVEYING CO. LLP, 05–17–23.
2. CONDITIONAL TRACK 1 BUILDING FOUNDATION AND TRACK 4 SLAB ON GRADE COVER THE ENTIRE BCP SITE.
3. ENVIRONMENTAL EASEMENT FOUND IN APPENDIX D.

Title:

INSTITUTIONAL CONTROL BOUNDARIES

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50th & 5th LIC LLC

ROUX

Compiled by: A.I.	Date: 28JUN23	FIGURE
Prepared by: G.M.	Scale: NOT TO SCALE	7
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y158.03.DWG		

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LEGEND

- SITE BOUNDARY
- GW-01 GROUNDWATER MONITORING WELL
- EP-31 ENDPOINT SAMPLE LOCATION
- SW-8 SIDEWALL SAMPLE LOCATION
- UST-17_9' UST BOTTOM SAMPLE
- SW-20_11' OVER EXCAVATION SW SAMPLES

30' 0 30'

NOTES

1. GROUNDWATER MONITORING WELL BORING AND CONSTRUCTION LOGS ARE LOCATED IN APPENDIX C OF THE SMP FOR REFERENCE.

N

Title:

GROUNDWATER MONITORING POINTS

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50TH & 5TH LIC LLC

ROUX

Compiled by: A.P.	Date: 30NOV23	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	8
Project Mgr: A.P.	Project: 2887.0004Y000	
File: 2887.0004Y158.07.DWG		

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APPENDICES

A. Environmental Easement
B. List of Site Contacts
C. Monitoring Well Boring and Construction Logs
D. Excavation Work Plan
E. Health and Safety Plan (including CAMP)
F. Quality Assurance Project Plan/Field Sampling Plan
G. Site Management Forms
H. Request to Import/Reuse Fill Material Form

APPENDIX A

Environmental Easement

Department of Finance

December 28, 2023

JON BROOKS
ABRAMSON BROOKS LLP
1051 PORT WASHINGTON BLVD. #322
PORT WASHINGTON, NY 11050

RE: Submitted Transaction Successfully Recorded

Dear JON BROOKS:

Document Identification Number 2023122700477001 which was submitted and intaken for Recording on 12/28/2023 8:31:41 AM, was successfully recorded on 12/28/2023 at 4:41 PM.

Below summarizes the status of the document(s).

Recording & Endorsement Cover Page(s) attached
2023122700477001

If you have questions or require further information, please send an email to acrishelp@finance.nyc.gov and someone will get back to you.

Thank you.

City Register

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

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2023122700477001002E8C7A

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 10**

Document ID: 2023122700477001 Document Date: 12-27-2023 Preparation Date: 12-27-2023
Document Type: EASEMENT
Document Page Count: 9

PRESENTER:
JON BROOKS
ABRAMSON BROOKS LLP
1051 PORT WASHINGTON BLVD. #322
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JBROOKS@ABRAMSONBROOKS.COM

RETURN TO:
JON BROOKS
ABRAMSON BROOKS LLP
1051 PORT WASHINGTON BLVD. #322
PORT WASHINGTON, NY 11050
516-455-0215
JBROOKS@ABRAMSONBROOKS.COM

PROPERTY DATA

Borough	Block	Lot	Unit	Address
QUEENS	17	1	Entire Lot	2-33 50TH AVENUE

Property Type: COMMERCIAL REAL ESTATE Easement

CROSS REFERENCE DATA

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

PARTIES

GRANTOR/SELLER:
50TH & 5TH LIC LLC
C/O: THE DOMAIN COMPANIES, 120 BROADWAY,
SUITE 1340
NEW YORK, NY 10271

GRANTEE/BUYER:
NYS DEPT 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:	$	82.00
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 12-28-2023 16:41
City Register File No.(CRFN): **2023000336392**

City Register Official Signature

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

THIS INDENTURE made this 27th day of December, 2023 between Owner, 50th & 5th LIC LLC, having an office at 71 Park Place ,Suite 1705, New York, New York (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, is the owner of real property located at the address of 2-23 50th Avenue (a/ka/ 49-20 Fifth Street) Long Island City, Queens, NY 11101 in the City of New York, County of Queens 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 17 Lot 1, being the same as that property conveyed to Grantor by deed dated 9/20/2021 and recorded in the City Register of the City of New York as CRFN # 2021000387738. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 1.740 +/- acres, and is hereinafter more fully described in the Land Title Survey dated 05/17/2023 prepared by Saied Halviland, 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, 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: C2412510521, 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) or raising livestock or producing animal products for human consumption, 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: C241251
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 has caused this instrument to be signed in its name.

50th & 5th LIC LLC:

By: _____

Print Name: STEPHEN OHNEMUS

Title: AUTHORIZED SIGNATORY Date: 12/21/23

Grantor's Acknowledgment

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

On the 21st day of December, in the year 2023, before me, the undersigned, personally appeared Stephen Ohnemus, 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.

Stephanie Blass
Notary Public - State of New York

STEPHANIE L. BLASS NOTARY PUBLIC STATE OF NEW YORK NO. 01BL6363086 QUALIFIED IN KINGS COUNTY COMM. EXP. 08-14-2025

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: Andrew Guglielmi
Andrew O. Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the 27th day of December, in the year 2023, before me, the undersigned, personally appeared Andrew O. Guglielmi, 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.

Jennifer Andaloro
Notary Public - State of New York

JENNIFER ANDALORO
Notary Public, State of New York
No. 02AN6098246
Qualified in Albany County
Commission Expires January 14, 2028

SCHEDULE "A" PROPERTY DESCRIPTION

Legal Description

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

BEGINNING at the corner formed by the intersection of the northerly line of 50th Avenue, formerly known as 4th Street, with the westerly line of 5th Street, formerly known as West Avenue;

RUNNING THENCE northerly along the westerly line of 5th Street, 200 feet to the southerly side of 49th Avenue, formerly known as 5th Street;

THENCE westerly along the southerly line of 49th Avenue, 400 feet;

THENCE southerly and parallel with 5th Street, 200 feet to the northerly line of 50th Avenue;

THENCE easterly and along the northerly line of 50th Avenue, 75 feet;

THENCE northerly and again parallel with 5th Street, 100 feet;

THENCE easterly and parallel with the southerly line of 49th Avenue, 40 feet;

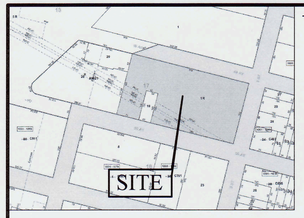
THENCE southerly and parallel with 5th Street, 100 feet to the northerly line of 50th Avenue;

THENCE easterly along the northerly line of 50th Avenue, 285 feet to the westerly line of 5th Street to the point or place of BEGINNING.

SURVEY NO. 67359—5

67359—5.DWG
67359—99b.CRD

TITLE NO. 301287Q



VICINITY MAP
NOT TO SCALE

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 may be obtained from the New York State Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov.

ENVIRONMENTAL EASEMENT AREA ACCESS

THE DEC OR THEIR AGENT MAY ACCESS THE ENVIRONMENTAL EASEMENT AREA AS SHOWN HEREON THROUGH ANY EXISTING STREET ACCESS OR BUILDING INGRESS/EGRESS ACCESS POINT.

ENVIRONMENTAL EASEMENT BOUNDARY

TRACK 4 CLEANUP STANDARDS ACHIEVED AREA BOUNDARY

PRILIMINARY FLOOD HAZARD NOTE

THE PARCEL SURVEYED IS COMPRISED OF AREAS DESIGNATED AS ZONE AE (EL 11 NAVD 1988)
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COMMUNITY PANEL NUMBER 360497 0202 G
EFFECTIVE DATE DECEMBER 5, 2013

FLOOD HAZARD NOTE

THE PARCEL SURVEYED IS COMPRISED OF AREAS DESIGNATED AS ZONE AE (EL 10 NGVD 1929, EL 8.9 NAVD 88)
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COMMUNITY PANEL NUMBER 360497 0202 F
EFFECTIVE DATE SEPTEMBER 5, 2007

DEED LEGAL DESCRIPTION

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

BEGINNING at the corner formed by the intersection of the northerly line of 50th Avenue, formerly known as 4th Street, with the westerly line of 5th Street, formerly known as West Avenue;

RUNNING THENCE northerly along the westerly line of 5th Street, 200 feet to the southerly side of 49th Avenue, formerly known as 5th Street;

THENCE westerly along the southerly line of 49th Avenue, 400 feet;

THENCE southerly and parallel with 5th Street, 200 feet to the northerly line of 50th Avenue;

THENCE easterly and along the northerly line of 50th Avenue, 75 feet;

THENCE northerly and again parallel with 5th Street, 100 feet;

THENCE easterly and parallel with the southerly line of 49th Avenue, 40 feet;

THENCE southerly and parallel with 5th Street, 100 feet to the northerly line of 50th Avenue;

THENCE easterly along the northerly line of 50th Avenue, 285 feet to the westerly line of 5th Street to the point or place of BEGINNING.

THE ABOVE DESCRIBED TAX LOT 1 HAS AN AREA OF 76,000 SQ. FT. OR 1.7447 ACRES.

SCHEDULE B ITEMS

2. Rights, easements and rights of way to construct, reconstruct, rebuild, alter, maintain, use and operate in perpetuity an underground railroad, tunnels and appurtenances in, through or under the Land, all railways, tunnels, easements of light, air access and support, terms, covenants and conditions in connection therewith, as referenced, disclosed and assigned/conveyed in and by (i) Indenture made between August Belmont, Andrew Freedman, Walter Luttgen, Walter G. Oakman, John Pierce, George W Young and William Barclay Parsons, as Surviving Trustees of the Creditors, Stockholders and Members of the New York & Long Island Railroad Company, and Interborough Rapid Transit Company dated July 24, 1913 and recorded October 17, 1913 in Liber 1906 Page 431 and (ii) Indentures made between Interborough Rapid Transit Company and The City of New York dated April 3, 1914 and recorded April 20, 1914 in Liber 1937 Page 253 and Liber 1937 Page 255.

   With regard thereto:

   a. Consents dated May 15, 1911 and recorded July 20, 1911 in Liber 1773 Page 115 and Liber 1773 Page 119.

3. Reservation and covenant set forth in Deed recorded in Liber 267 Page 51. (Not plottable)
4. Reservation and covenant set forth Deed recorded in Liber 267 Page 63. (Not plottable)
5. Reservation and covenant set forth Deed recorded in Liber 193 Page 1. (Not plottable)
6. Reservation and covenant set forth in Deed recorded in Liber 253 Page 205. (Not plottable)
7. Reservation and Covenant set forth in Deed recorded in Liber 2303 Page 359. (Not plottable)
9. REUC easements shown on the Tax Map for the City of New York and as disclosed by the Tax search as REUC #913-E3 assessed to NYC Transit re: railroad lands and improvements.
10. Terms, covenants and conditions contained in that certain Memorandum of Upzoning Restrictions made by and between 50th and 5th LIC LLC (formerly known as VD 50th LLC) and Fortress New York Holdings, Inc. dated as of September 20, 2021 and recorded October 1, 2021 as CRFN 202100038738.

ENVIRONMENTAL EASEMENT DESCRIPTION

TRACK 4 AREA 1

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

BEGINNING the corner formed by the intersection of the westerly side of 5th Street (60 feet wide) with the northerly side of 50th Avenue (60 feet wide);

RUNNING THENCE westerly, along the northerly side of 50th Avenue, 285 feet to a point,

RUNNING THENCE northerly, at right angles to the northerly side of 50th Avenue, 74.85 feet to a point;

RUNNING THENCE easterly, at right angles to the last mentioned course, 108.25 feet to a point;

RUNNING THENCE southerly, at right angles to the last mentioned course, 22.11 feet to a point;

RUNNING THENCE southeasterly, along a line forming an angle of 255 degrees 43 minutes 18 seconds on the southwest with the last mentioned course, 39.77 feet to a point;

RUNNING THENCE northeasterly, along a line forming an angle of 120 degrees 43 minutes 18 seconds on the north with the last mentioned course, 43.16 feet to a point;

RUNNING THENCE southeasterly, at right angles to the last mentioned course, 30.00 feet to a point;

RUNNING THENCE easterly, along a line forming an angle of 135 degrees 00 minutes 00 seconds on the northeast with the last mentioned course, 50.32 feet to a point;

RUNNING THENCE northerly, at right angles to the last mentioned course, 7.86 feet to a point;

RUNNING THENCE easterly, at right angles to the last mentioned course, 36.16 feet to the westerly side of 5th Street;

RUNNING THENCE southerly, along the westerly side of 5th Street, 60.10 feet to the northerly side of 50th Avenue, the corner the point or place of BEGINNING.

The above-described track has an area of 17,857 sq. ft or 0.4100 acre.

TRACK 4 AREA 2

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

BEGINNING at a point on the northerly side of 50th Avenue (60 feet wide), distance 325 feet westerly from the corner formed by the intersection of the westerly side of 5th Street (60 feet wide) with the northerly side of 50th Avenue;

RUNNING THENCE westerly, along the northerly side of 50th Avenue, 75.00 feet to a point,

RUNNING THENCE northerly, at right angles to the northerly side of 50th Avenue, 107.34 feet to a point;

RUNNING THENCE easterly, at right angles to the last mentioned course, 5.56 feet to a point;

RUNNING THENCE southeasterly, along a line forming an angle of 165 degrees 41 minutes 33 seconds on the south with the last mentioned course, 23.24 feet to a point;

RUNNING THENCE southerly, along a line forming an angle of 104 degrees 18 minutes 27 seconds on the southwest with the last mentioned course, 1.60 feet to a point;

RUNNING THENCE easterly, at right angles to the last mentioned course, 46.93 feet to a point;

RUNNING THENCE southerly, parallel with the westerly side of 5th Street, 100.00 feet to northerly side of 50th Avenue the point or place of BEGINNING.

The above-described track has an area of 7,641 sq. ft on 0.1754 Acre.

Track 4 Area 4

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

BEGINNING at a point on the southerly side of 49th Avenue (60 feet wide), distance 135.00 feet westerly from the corner formed by the southerly side of 49th Avenue with the westerly side of 5th Street (60 feet wide);

RUNNING THENCE southerly at right angles to southerly side of 49th Avenue , 25.00 feet to a point;

RUNNING THENCE easterly at right angles to the last mentioned course, 25.00 feet to a point;

RUNNING THENCE southerly at right angles to the last mentioned course, 25.00 feet to a point;

RUNNING THENCE westerly at right angles to the last mentioned course, 30.00 feet to a point;

RUNNING THENCE northerly at right angles to the last mentioned course, 25.00 feet to a point;

RUNNING THENCE westerly at right angles to the last mentioned course, 25.00 feet to a point;

RUNNING THENCE northerly at right angles to the last mentioned course, 25.00 feet to the southerly side of 49th Avenue;

RUNNING THENCE easterly along the southerly side of 49th Avenue, 30.00 feet to the point or place of BEGINNING.

The above-described track has an area of 1,500 sq. ft or 0.0344 acre.

Track 4 Area 3

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

BEGINNING at a point the following two courses and distances from the corner formed by the southerly side of 49th Avenue (60 feet wide) with the westerly side of 5th Street (60 feet wide);

THENCE westerly along the southerly side of 49th Avenue, 307.00 feet to a point;

THENCE southerly at right angles to the southerly side of 49th Avenue, 12.50 feet to the point or place of BEGINNING.

RUNNING THENCE southerly at right angles to the southerly side of 49th Avenue, 25.00 feet to a point;

RUNNING THENCE westerly at right angles to the last mentioned course, 30.00 feet to a point;

RUNNING THENCE northerly at right angles to the last mentioned course, 25.00 feet to a point;

RUNNING THENCE easterly at right angles to the last mentioned course, 30.00 feet to the point or place of BEGINNING.

The above-described track has an area of 750 sq. ft or 0.0172 acre.

Conditional Track Area 1

ALL that certain plot, piece or parcel of land situate lying and being in the Borough and County of Queens, City and State of New York bounded and described as follows:
BEGINNING at the corner formed by the intersection of the southerly side of 49th Avenue (60 feet wide) with the westerly side of 5th Street (60 feet wide);
RUNNING THENCE westerly along with southerly side of 49th Avenue, 135.00 feet to point;
RUNNING THENCE southerly at right angles to southerly side of 49th Avenue , 25.00 feet to a point;
RUNNING THENCE easterly at right angles to the last mentioned course, 25.00 feet to a point;
RUNNING THENCE southerly at right angles to the last mentioned course, 25.00 feet to a point;
RUNNING THENCE westerly at right angles to the last mentioned course, 30.00 feet to a point;
RUNNING THENCE northerly at right angles to the last mentioned course, 25.00 feet to a point;
RUNNING THENCE westerly at right angles to the last mentioned course, 25.00 feet to a point;
RUNNING THENCE northerly at right angles to the last mentioned course, 25.00 feet to the southerly side of 49th Avenue;
RUNNING THENCE westerly along the southerly side of 49th Avenue, 235.00 feet to a point;
RUNNING THENCE southerly parallel with the westerly side of 5th Street, 92.66 feet to a point;
RUNNING THENCE easterly at right angles to the last mentioned course, 5.56 feet to a point;
RUNNING THENCE southeasterly along a line forming an angle of 165 degrees 41 minutes 33 seconds on the south with the last mentioned course 23.24 feet to a point;
RUNNING THENCE southerly along a line forming an angle of 104 degrees 18 minutes 27 seconds on the southwest with the last mentioned course, 1.60 feet to a point;
RUNNING THENCE easterly at right angles to the last mentioned course, 86.93 feet to a point;
RUNNING THENCE southerly at right angles to the last mentioned course, 25.15 feet to a point;
RUNNING THENCE easterly at right angles to the last mentioned course, 108.25 feet to a point;
RUNNING THENCE southerly at right angles to the last mentioned course, 22.11 feet to a point;
RUNNING THENCE southeasterly along a line forming an angle of 255 degrees 43 minutes 18 seconds on the west with the last mentioned course, 39.77 feet to a point;
RUNNING THENCE northeasterly along a line forming an angle of 120 degrees 43 minutes 18 seconds on the north with the last mentioned course, 43.16 feet to a point;
RUNNING THENCE southeasterly at right angles to the last mentioned course, 30.00 feet to a point;
RUNNING THENCE easterly along a line forming an angle of 135 degrees 00 minutes 00 seconds on the northeast with the last mentioned course, 50.32 feet to a point;
RUNNING THENCE northerly at right angles to the last mentioned course, 7.86 feet to a point;
RUNNING THENCE easterly at right angles to the last mentioned course, 36.16 feet to the westerly side of 5th Street;
RUNNING THENCE northerly along the westerly side of 5th Street, 139.90 feet to the southerly side of 49th Avenue the corner the point or place of BEGINNING;
Excepting therefrom the following piece or parcel of land;
BEGINNING at a point the following two courses and distances from the corner formed by the intersection of the southerly side of 49th Avenue (60 feet wide) with the westerly side of 5th Street (60 feet wide);
THENCE westerly along the southerly side of 49th Avenue, 307.00 feet to a point;
THENCE southerly at right angles to the southerly side of 49th Avenue, 12.50 feet to the point or place of BEGINNING.
RUNNING THENCE southerly at right angles to the southerly side of 49th Avenue, 25.00 feet to a point;
RUNNING THENCE westerly at right angles to the last mentioned course, 30.00 feet to a point;
RUNNING THENCE northerly at right angles to the last mentioned course, 25.00 feet to a point;
RUNNING THENCE easterly at right angles to the last mentioned course, 30.00 feet to the point or place of BEGINNING.

The above-described track has an area of 48,252 sq. ft or 1.1077 acres.

LEGEND

ASPH.....ASPHALT
BK.....BRICK
BSMT.....BASEMENT
CC.....CURB CUT
CCR.....CONCRETE CURB ROUND
CD.....CELLAR DOOR
CLF.....CHAIN LINK FENCE
CO.....CATCH BASIN CLEAN OUT
CONC.....CONCRETE
CRF.....CHAIN ROPE FENCE
CWA.....CELLAR WINDOW AREA
DR.....DRAIN
EL.....ELEVATION
FAB.....FIRE ALARM BOX
FC.....FILL CAP
FL EL.....FLOOR ELEVATION
GP.....GUARD POLE
GV.....GAS VALVE
IF.....IRON FENCE
INL.....CATCH BASIN INLET ELEVATION
INV.....SEWER INVERT ELEVATION
LIGHT POLE
MB.....MAIL BOX
MHU.....UNKNOWN MANHOLE
OF.....OIL FILL
OHW.....OVERHEAD WIRES
P.....POLE
PAVT.....PAVEMENT
PM.....PARKING METER
PMULT...POLE, MULTIPLE USAGE
PEL.....PARAPET ELEVATION
REL.....ROOF ELEVATION
MONITORING WELL
PR.....PEDESTRIAN RAMP
RET.....RETAINING
RIM.....RIM ELEVATION SEWER MANHOLE
SFCR.....STEEL FACED CURB ROUND
STY.....STORY
TB.....TOP OF BANK ELEVATION
TRAFFIC LIGHT
TEL.....TELEPHONE
TP.....TREE PIT
TRAFFIC SIGN
TW.....ELEVATION AT TOP OF WALL
UP.....UTILITY POLE
VU.....VALVE UNKNOWN
VLTU.....VAULT UNKNOWN
VP.....VENT PIPE
WV.....WATER VALVE
12"G.....GAS MAIN WITH SIZE
12"S.....SEWER MAIN WITH SIZE
12"W.....WATER MAIN WITH SIZE
.....CATCH BASIN
E.....ELECTRIC MANHOLE / VAULT
F.....FIRE MANHOLE
G.....GAS MANHOLE
S.....SEWER MANHOLE
T.....TELEPHONE MANHOLE
W.....WATER MANHOLE
SUB.....SUBWAY MANHOLE
STV.....STEAM VALVE
TR.....TRAFFIC VAULT
.....HYDRANT
14.....TREE WITH SIZE
.....TRAFFIC FLOW

DRAWN: J.R.

20 0 20 40 60
GRAPHIC SCALE — FEET

0 2.4 4.8 7.2 9.6M
1 CM = 2.4 M

REV	DATE	DESCRIPTION	ck

REV	DATE	DESCRIPTION	ck
	05—17—23	ENVIRONMENTAL EASEMENT SURVEY	
A	12—19—23	TRACK 4 AREA 1 REVISED & AREA 3 & AREA 4 ADDED	
B	12—26—23	TRACK 1 DESCRIPTION ADDED & TOTAL EASEMENT BOUNDARY AMENDED	

ESTABLISHED 1876 * SUCCESSOR TO:
B.G. MEINKHEIM C.S.*C.U. POWELL C.E.,C.S.*L.C.L. SMITH C.S.*NATHAN CAMPBELL C.E.,C.S.*A.U. WHITSON C.E.,C.S.*
WILLIAM L. SAVACOOL C.E.,L.S.,O.S.*A.U. WHITSON INC. C.E.,C.S.*G. WEBER L.S.,C.S.*C. STIDOLPH R.A.,L.S.*WHITSON & POWELL INC. P.E.,L.S.,C.S.*KELLER & POWELL P.E.,L.S.,C.S.*LOUIS MONTROSE C.E.,L.S.,C.S.*FRED J. POWELL P.E.,L.S.,C.S.*

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CITY & LAND SURVEYORS
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WWW.MONTROSESURVEYING.COM Email: Info@montrosesurveying.com

STATE OF NEW YORK
SAEED JALILVAND
050236
LICENSED LAND SURVEYOR

CITY OF NEW YORK
COUNTY QUEENS
TAX BLOCK 17
TAX LOT 1

SCALE: 1" = 20'

APPENDIX B

List of Site Contacts

Name	Phone/Email Address
Peter Papamichael[Site Owner]	(718) 707-2884 p.papamichael@vorea.com
50th and 5th LIC, LLC [Remedial Party]	(718) 707-2884 p.papamichael@vorea.com
Craig Werle[Qualified Environmental Professional] Charles J. McGuckin [Remedial Engineer]	(631) 630-2337 cwerle@rouxinc.com (631) 630-2346 cmcguckin@rouxinc.com
Sydney Sobol [NYSDEC DER Project Manager]	(518) 402-4799 sydney.sobol@dec.ny.gov
Douglas MacNeal[NYSDEC DER Project Manager's Supervisor]	(518) 402-9684 douglas.macneal@dec.ny.gov
Kelly Lewandowski [NYSDEC Site Control] Harolyn Hood[NYSDOH Project Manager]	(518) 402-9569 kelly.lewandowski@dec.ny.gov (518) 473-4780 harolyn.hood@health.ny.gov
[On and off-site access contacts such as tenants, adjacent property owners, etc.]	
Jon Schuyler Brooks [Remedial Party Attorney]	(516) 455-0215 jbrooks@abramsonbrooks.com

APPENDIX C

Monitoring Well Boring and Construction Logs

RXSB-8

Client: The Vorea Construction Companies, LLC	Site: Fortress	Project Number: 2887.0004Y101
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella/L. Jenkins

Start to Finish Date: 7/20/2020 - 7/20/2020	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 15 feet	Backfill: #2 Sand/Cuttings	Borehole Diameter: 2-inches	DTW: 8 feet
Area: Warehouse Interior	Elevation: NM	Northing: NM	Easting: NM

Depth (ft)	Groundwater & Product Levels	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		CONC		Concrete floor slab (4.5" thick).				Handcleared to 5' bls.
		MIXD		Brick (FILL); dry.	G	0.7	0.1	
				Dark brown, fine to medium SAND, some Silt, trace brick (FILL); dry.	G	0.5	0.0	
					G	1	2.4	Collected RXSB-8(2-5).
		MIXD			G	1	0.6	
					G	1	0.0	
5				Grayish brown, SILT, little fine Sand, trace organics; slightly moist				Collected RXSB-8(5-11).
	GROUND WATER LEVEL 7/20/2020	MLS				5		Water table encountered at approx. 8' bls.
10				Grayish brown, SILT, trace fine Sand; saturated.			0.0	
		ML				5		

Bottom of borehole at 15 feet

RXSB-10

Client: The Vorea Construction Companies, LLC	Site: Fortress	Project Number: 2887.0004Y101
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella/L. Jenkins

Start to Finish Date: 7/22/2020 - 7/22/2020	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand/Cuttings	Borehole Diameter: 2-inches	DTW: 11 feet
Area: Site Exterior	Elevation: NM	Northing: NM	Easting: NM

Depth (ft)	Groundwater & Product Levels	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		MIXD		Brown, fine to coarse SAND, some Silt, trace brick and organics (FILL); dry.	G	1	0.2	Handcleared to 5' bls. Collected RXSB-10(0-2).
					G	1	0.3	
					G	1	0.1	
					G	1	0.7	
					G	1	0.2	
					G	1	7.2	
5		MIXD		Dark brown, fine to coarse SAND, some Silt, little Brick and Concrete (FILL); dry.				
				Gray, fine to medium SAND, some Silt; saturated.		1.5		Collected RXSB-10(8-10).
10	▽ GROUND WATER LEVEL 7/22/2020	SP-SM					4.6	Water table encountered at approx. 11' bls.
				Gray, SILT, trace clay; saturated.		3		
		ML						
15				Brown, SILT; saturated.			0.2	
		ML				4		
				Bottom of borehole at 20 feet				

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RXSB/SV-11

Client: 50th & 5th LIC LLC	Site: Former FO Pierce Company	Project Number: 2887.0004Y000
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella

Start to Finish Date: 7/14/2021 - 7/14/2021	Contractor: AARCO	Drill Type: Geoprobe 7822DT	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 15 feet	Backfill: #2 Sand/Bentonite	Borehole Diameter: 2-inches	DTW: 7 feet
Area: Exterior Western Grass	Elevation: 8.07	Northing: 210252.4	Easting: 995956.5

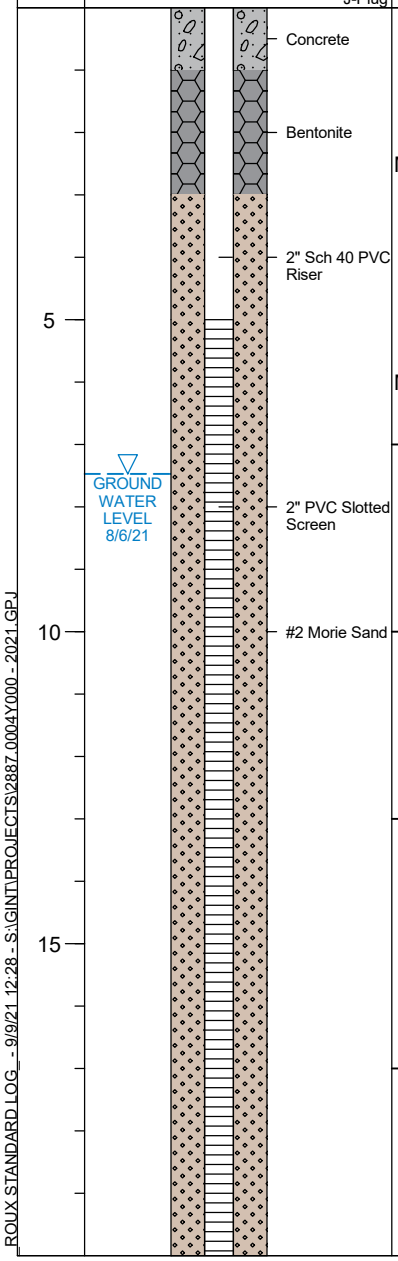
Depth (ft)	Groundwater & Product Levels	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		MIXD		Brown, fine to coarse SAND, some fine to medium Gravel, Brick, Concrete, Asphalt, little Silt (FILL); dry.	G	5		Hand cleared to 5 ft bls. Collected sample RXSB-11(1-3).
		MIXD		Brown, fine to coarse SAND, some fine to medium Gravel, Brick, Concrete, Asphalt, little Silt (FILL); moist.				
5		SP-SM		Brown, fine SAND, some Silt; very moist.		2.5		
	GROUND WATER LEVEL 7/14/21			Brown, fine SAND, some Silt; wet.				Collected sample RXSB-11 (7-11). Water table encountered at approximately 7 ft bls in soil.
10		SP-SM						
		SM		Greyish brown, fine SAND and SILT, trace peat and organics; wet.		4		Collected sample RXSB-11(13-15).
				Bottom of borehole at 15 feet				

RXSB/SV/MW-12

Client: 50th & 5th LIC LLC	Site: Former FO Pierce Company	Project Number: 2887.0004Y000
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella

Start to Finish Date: 7/14/2021 - 7/14/2021	Contractor: AARCO	Drill Type: Geoprobe 7822DT	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand/Clean Cuttings	Borehole Diameter: 6-inches	DTW: 7.47 feet
Area: Exterior Western Grass	Elevation: 8.65	Northing: 210166.8	Easting: 995981.2

Well Depth: 20 feet	Well Dia./Materials: 2-inch SCH 40 PVC	Screen Interval: 5-20 feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: Morie #2	Annular Seal: Bentonite



Depth (ft)	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
	MIXD		Brown, fine to medium SAND, little Silt and fine Gravel, Concrete, Asphalt, Wire (FILL); dry.	G	5	0.0 0.2 0.2 0.2 0.2	Hand cleared to 5 ft bls. Collected sample RXSB-12(1-3) and DUP_SO_07142021_1.
5	MIXD		Brown, fine to medium SAND, little Silt and fine Gravel, Concrete, Asphalt, Wire (FILL); moist.				
	SP-SM		Brown, fine SAND, some Silt; moist.		3.5	0.2	Collected sample RXSB-12(7-9).
10			No Recovery.		1		Water table encountered at approximately 10 ft bls in soil.
	SP-SM		Brown, fine SAND, some Silt, trace organics; wet.			0.3	Collected sample RXSB-12(13-15).
15	SP-SM		Grey, fine SAND, some Silt, trace organics; wet.		5	0.3 0.2	

Bottom of borehole at 20 feet

RXSB/SV-17

Client: 50th & 5th LIC LLC	Site: Former FO Pierce Company	Project Number: 2887.0004Y000
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella

Start to Finish Date: 7/20/2021 - 7/21/2021	Contractor: AARCO	Drill Type: Geoprobe 420 M	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 16 feet	Backfill: #2 Sand/Bentonite	Borehole Diameter: 2-inches	DTW: 9 feet
Area: Warehouse Interior	Elevation: 10.18	Northing: 210177.7	Easting: 996085.3

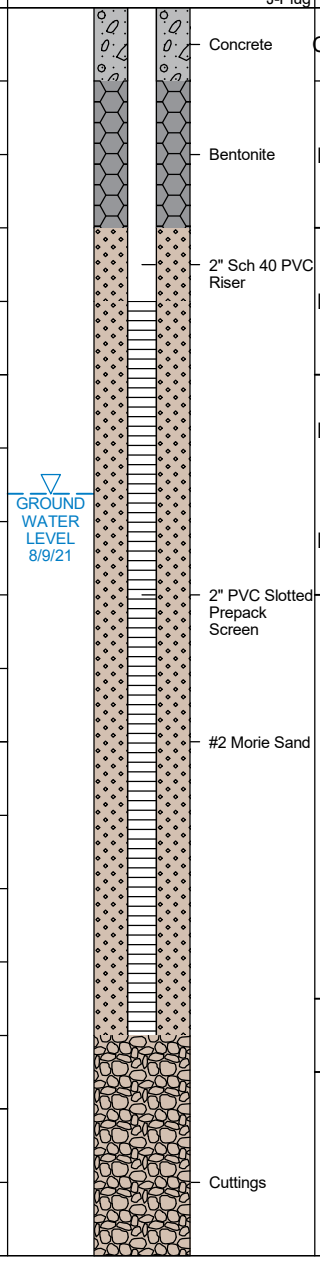
Depth (ft)	Groundwater & Product Levels	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		CONC		CONCRETE and SUBBASE.			0.1	Hand cleared to 5 ft bls.
		MIXD		Brown, fine to medium SAND, trace silt, brick, concrete, glass, wood (FILL); dry.	G	5	0.2	Collect sample RXSB-17(1-3).
				Reddish brown, fine SAND, trace silt; moist.			0.2	
							0.1	
5		SP					0.2	
						3.5	0.1	Collect sample RXSB-17(7-9).
	▽ GROUND WATER LEVEL 7/21/21			Reddish brown, fine SAND, trace silt; wet.				Water table encountered at approximately 9 ft bls in soil.
10							0.1	
		SP				5		
							0.2	Collect sample RXSB-17(13-15).
15				Brown, fine SAND, trace silt; wet.			0.2	
		SP						
				Bottom of borehole at 16 feet				

RXSB/MW-18

Client: 50th & 5th LIC LLC	Site: Former FO Pierce Company	Project Number: 2887.0004Y000
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella

Start to Finish Date: 7/20/2021 - 7/28/2021	Contractor: AARCO	Drill Type: Geoprobe 420 M	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 17 feet	Backfill: #2 Sand/Clean Cuttings	Borehole Diameter: 2-inches	DTW: 6.62 feet
Area: Warehouse Interior	Elevation: 8.26	Northing: 210145.4	Easting: 996212.8

Well Depth: 17 feet	Well Dia./Materials: 1-inch SCH 40 PVC	Screen Interval: 4-14 feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size:	Annular Seal: Bentonite



Depth (ft)	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
0	CONC		CONCRETE and SUBBASE.			0.0	
	MIXD		Brown, fine to coarse SAND, trace silt, brick, concrete, wood (FILL); dry.			0.0	Hand cleared to 5 ft bls.
				G	5	0.0	Collect sample RXSB-18(1-3).
	MIXD		Brown, fine SAND, little Silt and Gravel, trace brick, concrete (FILL); moist.			0.0	
5	MIXD		Brown, fine to medium SAND, some Brick, Concrete, trace silt (FILL); moist.			0.0	
	MIXD		Brown, fine to medium SAND, some Brick, Concrete, trace silt (FILL); wet.		3	0.0	Water table encountered at approximately 6.5 ft bls in soil. Collect sample RXSB-18(7-9).
	SM		Dark brown, fine SAND and SILT; wet.			0.0	
10					2.5	0.0	
	PT		Dark brown to grey, PEAT and ORGANICS, some Silt and Clay, trace sand; wet.			0.2	Collect sample RXSB-18(13-15). Organic odor observed.
						0.0	
	SM		Grey, fine SAND and SILT, trace clay; wet.		2	0.0	
15			Bottom of borehole at 17 feet				

RXSB/SV-19

Client: 50th & 5th LIC LLC	Site: Former FO Pierce Company	Project Number: 2887.0004Y000
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: D. Miserendino

Start to Finish Date: 7/26/2021 - 7/26/2021	Contractor: AARCO	Drill Type: Geoprobe 420 M	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 17 feet	Backfill: #2 Sand/Bentonite	Borehole Diameter: 2-inches	DTW: 7.5 feet
Area: Warehouse Interior	Elevation: 9.81	Northing: 210168.7	Easting: 996262

Depth (ft)	Groundwater & Product Levels	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		CONC		CONCRETE.				
		MIXD		Dark brown, fine to medium SAND, little Brick, Concrete, Gravel (FILL); moist.			0.0	Hand cleared to 5 ft bls.
					G	5	0.0	Collect sample RXSB-19(1-3).
		SP-SM		Light brown, fine SAND, some Silt, trace gravel; moist.			0.0	
							0.0	
5							0.0	
		SM		Light brown, fine SAND and SILT, trace clay; moist				
	GROUND WATER LEVEL 7/26/21	SM		Light brown, fine SAND and SILT, trace clay; wet.		4		Collect sample RXSB-19(7-9). Water table encountered at approximately 7.5 ft bls in soil.
				Greyish brown, fine SAND and SILT, trace organics; wet.			0.0	
		SM						
10								
		SM		Dark brown, fine SAND and SILT, trace organics; wet.			0.0	
						3.5		
		SM		Grey, fine SAND and SILT, trace clay and organics; wet.			0.0	Collect sample RXSB-19(13-15).
				Greyish brown, fine SAND and SILT, trace clay and organics; wet.			0.1	
15								
		SM				2		Clay lens observed at 16.5' bls.
				Bottom of borehole at 17 feet				

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RXSB-24

Client: 50th & 5th LIC LLC	Site: Former FO Pierce Company	Project Number: 2887.0004Y000
Address: 2-33 50 Avenue	City/State: Long Island City, New York	Logged By: B. Vella

Start to Finish Date: 7/16/2021 - 7/16/2021	Contractor: AARCO	Drill Type: Geoprobe 7822DT	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand/Clean Cuttings	Borehole Diameter: 2-inches	DTW: 12 feet
Area: Exterior Parking Lot	Elevation: 10.17	Northing: 210232.3	Easting: 996101.9

Depth (ft)	Groundwater & Product Levels	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		ASPH		ASPHALT and SUBBASE.			0.0	
				Brown, fine to medium SAND, some Silt, little Brick (FILL); dry.			0.1	Hand cleared to 5 ft bls.
		MIXD			G	5	0.1	Collect sample RXSB-24(1-3).
5				Light brown, fine to medium SAND, some Silt; dry.			0.1	
		SP-SM				2		Collect sample RXSB-24(7-9).
				Light brown, fine to medium SAND, some Silt; moist.			0.1	
10		SP-SM					0.1	
	GROUND WATER LEVEL 7/16/21			Grey to brown, fine to medium SAND, some Silt; wet.		5	1.5	Water table enountered at approximately 12 ft bls in soil. Collect sample RXSB-24(13-15).
							1.9	
15		SP-SM					0.3	
						5		
				Bottom of borehole at 20 feet				

GW-01

Client:	Site:	Project Number:
Vorea	2-33 50th Ave	2887.0004Y
Address:	**City/State:**	**Logged By:**
2-33 50th Ave	Long Island City, NY	TM

Start to Finish Date:	Contractor:	Drill Type:	Sampler Type/Method:
9/6/2023 - 9/6/2023	AARCO	Mud Rotary	2" Split Spoon
Borehole Depth:	**Backfill:**	**Borehole Diameter:**	**DTW:**
23 feet	#2 Sand	4-inches	6 feet
Area:	**Elevation:**	**Northing:**	**Easting:**
NM	NM	NM	NM

Well Depth:	Well Dia./Materials:	Screen Interval:	Screen Slot Size:	Sand/Filter Pack Size:	Annular Seal:
23 feet	2-inch PVC	6ft BLS-16ft BLS feet	20-Slot	#2	

Depth (ft)	Well Diagram	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
0	Schedule 40 PVC Riser	MIXD		Greyish brown, GRAVEL, Brick, little coarse Sand				
5	Schedule 40 PVC Riser							
		CONC		Flowable Fill				
10	Schedule 40 0.20 Slot PVC Screen	SP		Dark Grey, fine SAND, some Silt; wet		2	0.1	
15						2	0.0	
20	Schedule 40 PVC Riser	SPG		Brown-Grey, fine to coarse SAND, little Gravel; wet		2	0.0	

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Client:	Site:	Project Number:
Vorea	2-33 50th Ave	2887.0004Y
Address:	**City/State:**	**Logged By:**
2-33 50th Ave	Long Island City, NY	TM

Depth (ft)	Well Diagram	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		BEDR		Bedrock				

GW-02

Client: Vorea	Site: 2-33 50th Ave	Project Number: 2887.0004Y
Address: 2-33 50th Ave	City/State: Long Island City, NY	Logged By: TM

Start to Finish Date: 9/7/2023 - 9/7/2023	Contractor: AARCO	Drill Type: Mud Rotary	Sampler Type/Method: 2" Split Spoon
Borehole Depth: 20 feet	Backfill: #2 Sand	Borehole Diameter: 4-inches	DTW: 8 feet
Area: NM	Elevation: NM	Northing: NM	Easting: NM

Well Depth: 20 feet	Well Dia./Materials: 2-inch PVC	Screen Interval: 6ft BLS-16ft BLS feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: #2	Annular Seal:

Depth (ft)	Well Diagram	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
	Schedule 40 PVC Riser			Void Space (Sonotube)				
5	Schedule 40 PVC Riser							
		CONC		Flowable Fill				
10	Schedule 40 0.20 Slot PVC Screen	SP-SM		Medium-Dark brown, fine to medium SAND, little Silt; wet		2	0.1	
15	Schedule 40 PVC Riser	SP-SM		Greyish brown, fine to medium SAND, little Silt; wet		2	0.0	

GW-03

Client: Vorea	Site: 2-33 50th Ave	Project Number: 2887.0004Y
Address: 2-33 50th Ave	City/State: Long Island City, NY	Logged By: SC

Start to Finish Date: 7/19/2023 - 7/20/2019	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand	Borehole Diameter: 4-inches	DTW: 9 feet
Area: NM	Elevation: NM	Northing: NM	Easting: NM

Well Depth: 16 feet	Well Dia./Materials: 2-inch PVC	Screen Interval: 6ft BLS-16ft BLS feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: #2	Annular Seal:

Depth (ft)	Well Diagram	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
		GWS		Greyish brown, GRAVEL, some Brick, little coarse Sand			1.2	
	Schedule 40 PVC Riser							
				Light brown, fine SAND	G	5	1.2	
		SP					0	
		SP		Light brown, fine SAND, little dark brown fine Sand			>700	High PID reading was observed from one small localized spot and not observed elsewhere. All suspect material removed during pre-clearing. surrounding PID readings nominal
5	Schedule 40 PVC Riser			No Recovery		0		
10	Schedule 40 0.20 Slot PVC Screen	SW		Grey, fine to coarse SAND; wet			0	
		SP		Light brown, fine SAND, some medium Sand			0	
		SP		Greyish brown, fine SAND, some medium Sand		3	0.1	
15		SP		Greyish brown, coarse SAND, some medium to fine Sand		5	0.1	

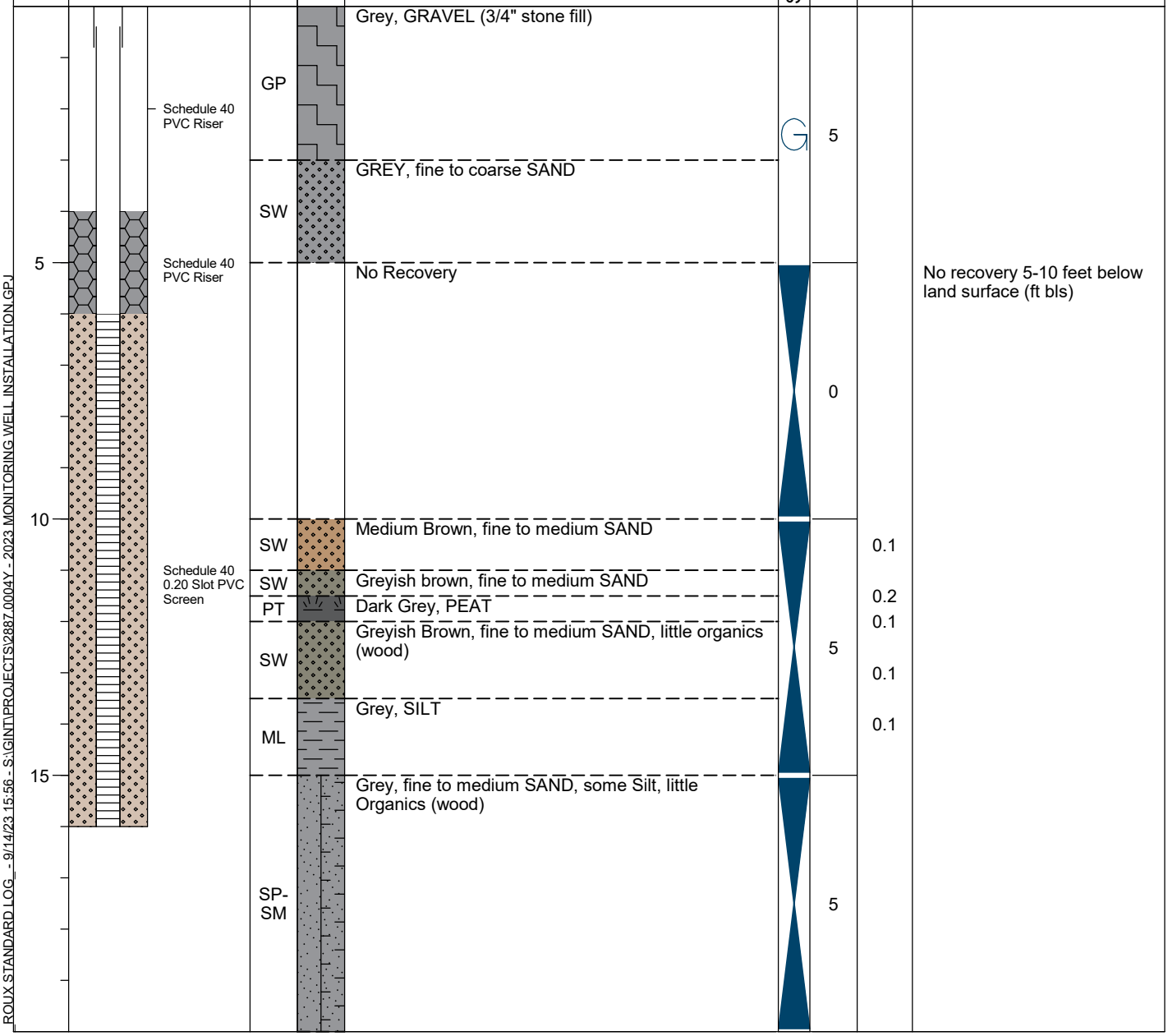
ROUX STANDARD LOG_ - 9/14/23 15:56 - S:\GINT\PROJECTS\2887.0004Y - 2023 MONITORING WELL INSTALLATION.GPJ

GW-04

Client: Vorea	Site: 2-33 50th Ave	Project Number: 2887.0004Y
Address: 2-33 50th Ave	City/State: Long Island City, NY	Logged By: SC

Start to Finish Date: 7/20/2019 - 7/21/2023	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand	Borehole Diameter: 4-inches	DTW: 8 feet
Area: NM	Elevation: NM	Northing: NM	Easting: NM

Well Depth: 16 feet	Well Dia./Materials: 2-inch PVC	Screen Interval: 6ft BLS-16ft BLS feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: #2	Annular Seal:



GW-05

Client: Vorea	Site: 2-33 50th Ave	Project Number: 2887.0004Y
Address: 2-33 50th Ave	City/State: Long Island City, NY	Logged By: SC

Start to Finish Date: 7/20/2019 - 7/21/2023	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand	Borehole Diameter: 4-inches	DTW: 7 feet
Area: NM	Elevation: NM	Northing: NM	Easting: NM

Well Depth: 16 feet	Well Dia./Materials: 2-inch PVC	Screen Interval: 6ft BLS-16ft BLS feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: #2	Annular Seal:

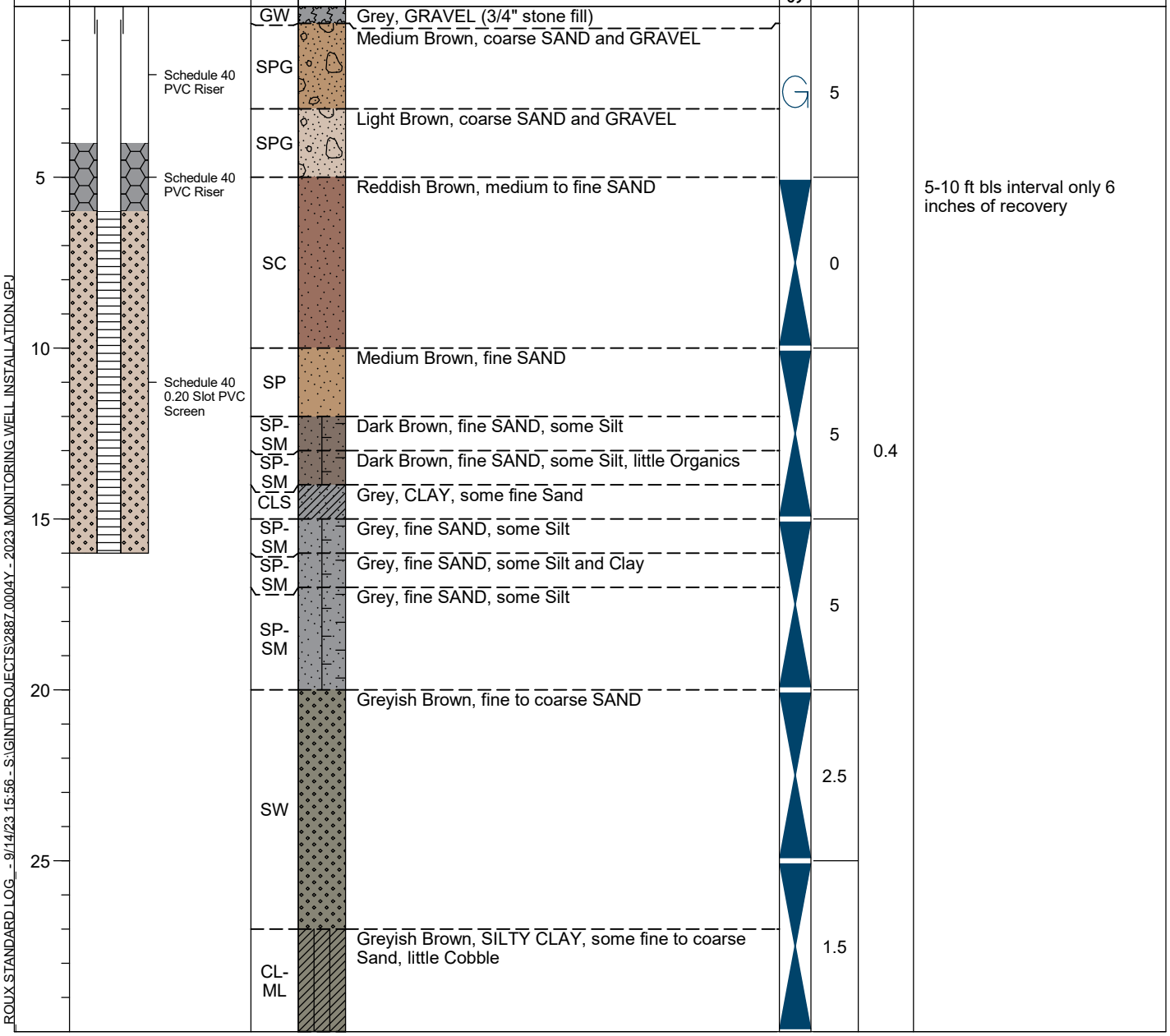
Depth (ft)	Well Diagram	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
0	Schedule 40 PVC Riser	GW		Grey, GRAVEL (3/4" stone fill)	G	5		
		SW		GREY, fine to coarse SAND				
5	Schedule 40 PVC Riser	SP		Medium Brown, fine to medium SAND		2		
		PT		Dark Grey, PEAT				
		SP		Greyish Brown, fine to medium SAND, little Organics				
10	Schedule 40 0.20 Slot PVC Screen	PT		Dark Grey, PEAT		4		
		SM		Greyish Brown, fine SAND and SILT				
15		ML		Greyish Brown, SILT		5		
		SW		Greyish Brown, fine to coarse SAND				

GW-06

Client: Vorea	Site: 2-33 50th Ave	Project Number: 2887.0004Y
Address: 2-33 50th Ave	City/State: Long Island City, NY	Logged By: SC

Start to Finish Date: 7/19/2023 - 7/19/2023	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 30 feet	Backfill: #2 Sand	Borehole Diameter: 4-inches	DTW: 9 feet
Area: NM	Elevation: NM	Northing: NM	Easting: NM

Well Depth: 16 feet	Well Dia./Materials: 2-inch PVC	Screen Interval: 6ft BLS-16ft BLS feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: #2	Annular Seal:



GW-07

Client: Vorea	Site: 2-33 50th Ave	Project Number: 2887.0004Y
Address: 2-33 50th Ave	City/State: Long Island City, NY	Logged By: SC

Start to Finish Date: 7/19/2023 - 7/21/2023	Contractor: AARCO	Drill Type: Geoprobe	Sampler Type/Method: 2" Macro-Core
Borehole Depth: 20 feet	Backfill: #2 Sand	Borehole Diameter: 4-inches	DTW: 10 feet
Area: NM	Elevation: NM	Northing: NM	Easting: NM

Well Depth: 16 feet	Well Dia./Materials: 2-inch PVC	Screen Interval: 6ft BLS-16ft BLS feet	Screen Slot Size: 20-Slot	Sand/Filter Pack Size: #2	Annular Seal:

Depth (ft)	Well Diagram	USCS	USCS Graphic	Visual Description	Sample Interval	Recovery (ft)	PID	Notes
	Schedule 40 PVC Riser	CONC		Concrete				
		SPG		Medium Brown, coarse SAND and GRAVEL	G	5		
		SPG		Light Brown, coarse SAND and GRAVEL				
5	Schedule 40 PVC Riser			no recovery		0		no recovery 5-10
10	Schedule 40 0.20 Slot PVC Screen	SP		Dark Grey, fine to medium SAND, little metal debris		3.5		
		SM		Dark Grey, fine SAND, some Silt				
		SP-SM		Greyish Brown, fine to medium SAND, some Silt				
15		CL-ML		Dark Grey, CLAY, some Silt		5	4.0	Slight odor observed from 15 to 19 ft bls
		MLS		Grey, SILT, fine to medium SAND			2.6	
		SP		Greyish Brown, fine to medium SAND				
		SP		Medium Brown, coarse SAND				

APPENDIX D

Excavation Work Plan

APPENDIX D – EXCAVATION WORK PLAN (EWP)

D-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 B.

Table 1 : Notifications*

Sydney Sobol, NYSDEC Project Manager	Phone: (518) 402-4799 Email: sydney.sobol@dec.ny.gov
Douglas MacNeal, NYSDEC Project Manager Supervisor	Phone: (518) 402-9684 Email: douglas.macneal@dec.ny.gov
Kelly Lewandowski, NYSDEC Site Control Section Chief	Phone: (518) 402-9569 Email: kelly.lewandowski@dec.ny.gov
Harolyn Hood, NYSDOH Project Manager	Phone: (518) 473-4780 Email: Harolyn.hood@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; and
- 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.

D-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 Sections D-6 and D-7 of this Appendix.

D-3 SOIL STAGING METHODS

Although direct-loading of trucks will be performed to the extent practical, stockpiles, if any, 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.

Stockpiles, if any, will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

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

Water will be available on-Site at suitable supply and pressure for use in dust control.

D-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.

D-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.

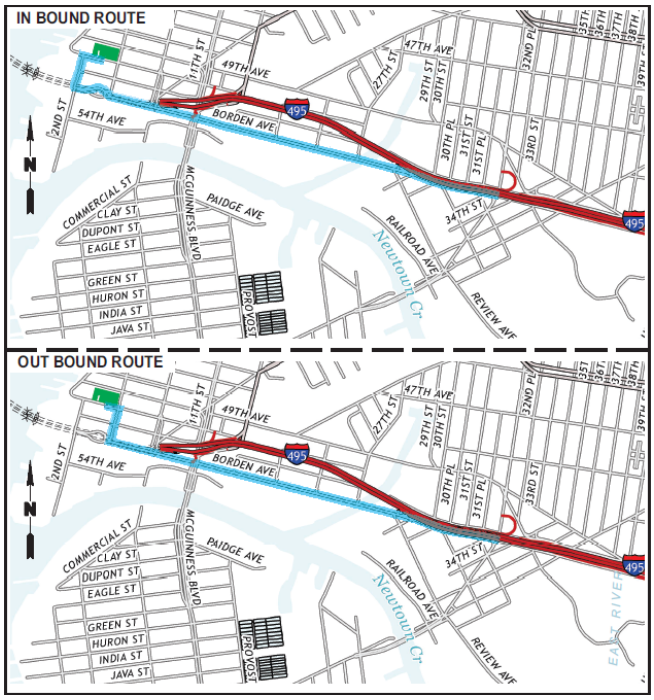
Truck transport routes are as follows:

From Site:

- Head east on 50th avenue toward 5th Street.
- Turn right at the first cross street onto 5th Street.
- Turn left onto Borden Avenue.
- Turn left onto ramp for I-495 east.
- Keep left at the fork, follow signs for LIE I-495 east.

To site:

- Take exit 15 for Van Dam Street from I-495 w then merge onto Borden Avenue/Queens Midtown Expressway.
- Turn left then right toward Borden Avenue then continue onto Borden Avenue.
- Turn right onto Center Boulevard then right onto 50th Avenue. Site is located on the left.



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.

D-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).

D-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. 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 April 2023 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 D-2 and D-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.

D-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.

D-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. The existing cover system is comprised of:

- A concrete slab on grade comprised of a 16" reinforced concrete slab, underlaid by a demarcation layer, underlaid by a minimum of 8 inches of clean NYSDEC approved stone or additional concrete.

The demarcation layer, consisting of vapor barrier beneath the Track 4 slab on grade, 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) (as shown on Figure 5) 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.

D-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.

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

A Request to Import/Reuse Fill or Soil form, which can be found 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. A copy of the form is presented in Appendix J.

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 commercial/ restricted residential use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 7. 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.

D-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 shall 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 shall 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 shall 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.

D-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 two 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.

D-13 COMMUNITY AIR MONITORING PLAN

The Community Air Monitoring Plan (CAMP) is included within Appendix H of the Health and Safety Plan (HASP), which is included within this SMP as Appendix E.

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

D-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site. Specific odor control methods to be used on a routine basis will include limiting open excavation areas and covering excavated soil (i.e., with polyethylene sheeting or in covered roll off containers). 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 through periodic perimeter screenings.

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.

D-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section D-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, or onsite water sources for wetting. The equipment will be equipped with a water cannon or nozzle 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.

D-16 OTHER NUISANCES

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

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

APPENDIX E

Health and Safety Plan (including CAMP)

Site-Specific Health and Safety Plan

2-33 50th Avenue
Block 17 Lot 1
Long Island City, New York

July 17, 2023

Prepared for:

50th & 5th LIC LLC
184 North 8th Street
Brooklyn, New York 11211

Prepared by:

Roux Environmental Engineering and Geology, D.P.C.
209 Shafter Street
Islandia, New York 11749

2887.0004Y119R/CV

Table of Contents

Table of Contents (Continued)

Table

Figures

Appendices

Site-Specific Emergency Information

Emergency Phone Numbers

Most emergency services can be obtained by calling 911. Where 911 service is not available, use the telephone numbers provided in the below table. The following is a master emergency phone list for use by the project management personnel. A more condensed version of the emergency numbers listed below will be posted throughout project work areas. Emergencies encountered on the site will be responded to by a combination of off-site emergency services and site personnel.

Emergency Contact Information			
Site Personnel			
Title	**Contact**		**Telephone**
Project Manager (PM)	Alexander Policastro, PE		(516) 375-5580
Site Supervisor (SS)	Brian Foley		(631) 871-7066
Site Health and Site Safety Officer (SHSO)	Natalia Barragan-Valderrama		(914) 282-3715
Corporate Health and Safety Director (CHSD)	Brian Hobbs		(631) 630-2419
Client Emergency Contact	TBD		
Outside Assistance			
Agency	**Contact**	**Telephone**	**Address/Location**
Urgent Care Facility	Forest Urgent Care LIC and Forest Hills	(347) 318-5488	10-11 49th Avenue, Queens, New York 11101
Police	New York City Police Department	(718) 361-1021	4707 Pearson Place Long Island City, New York 11101
Fire	FDNY Engine 258/Ladder 115	(718) 999-2000	10-40 47th Avenue, Long Island City, New York 11101
Site Address	2-33 50th Avenue, Long Island City, New York 11101		

Forest Urgent Care LIC and Forest Hills:
2-33 50th Avenue, Long Island City, New York 11101

- Head west on 49th Avenue toward Vernon Blvd, turn left onto Vernon Blvd
- Turn right onto 50th Ave, destination will be on the right (10-11 49th Ave, Queens, New York 11101)

New York Presbyterian Hospital Offices:
2-33 50th Avenue, Long Island City, New York 11101

- Head northwest on E 61st St towards 1st Ave, turn left onto 2nd Ave, take 495 E ramp using left lane
- Continue onto I-495 E, and then onto Queens Midtown Tunnel
- Take Exit 13 towards Pulaski Bridge
- Right onto Borden Ave, right onto Center Blvd
- Turn right onto 50th, destination will be on the left (525 E 68th St, New York, New York 10065)

1. Introduction

This Site-specific Health and Safety Plan (HASP) has been prepared by Roux Environmental Engineering and Geology, D.P.C. (Roux) for use during Remedial Action (RA) activities at 2-33 50th Avenue, Long Island City, New York 11101 (see **Figure 1**). These activities fall within the scope of operations covered by the Occupational Safety and Health Administration (OSHA) standards promulgated at 29 CFR 1910.120 and 29 CFR 1926.65, both commonly referred to as the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard. In accordance with the HAZWOPER Standard, this site-specific HASP was prepared to address the safety and health hazards associated with the drilling, and environmental sampling activities being performed at the Site by Roux and to provide requirements and procedures for the protection of Roux employees, subcontractor personnel, government oversight personnel, Site personnel, and the general public. It also addresses client- and Site-specific requirements for health and safety.

Implementation of this HASP is the joint responsibilities of the project manager, the site health and safety officer, and all field staff, with assistance from the project principal and the office health and safety manager. The project manager for this project is Alexander Policastro; the site health and safety officer and the site supervisor will be determined prior to the start of the project.

1.1 Roles and Responsibilities

Overall Roles and Responsibilities (R&Rs) of Roux personnel are provided in Roux's Policies and Procedures Manual. Only those R&Rs specific to HASP requirements are listed below.

Project Manager (PM)

The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the Site Health and Safety Officer (SHSO), has the authority to oversee and monitor the performance of the SHSO, and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

- Preparing and coordinating the site work plan;
- Providing site supervisor(s) with work assignments and overseeing their performance; Coordinating safety and health efforts with the SSHO;
- Ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); and
- Serving as primary site liaison with public agencies, officials, and site contractors.

Site Health and Safety Officer (SHSO)

The SHSO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SHSO reports to the Project Manager. The SHSO is on site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SHSO include:

- Managing the safety and health functions on this site;
- Serving as the site's point of contact for safety and health matters;
- Ensuring site monitoring, worker training, and effective selection and use of PPE;
- Assessing site conditions for unsafe acts and conditions and providing corrective action;

- Assisting the preparation and review of this hasp;
- Maintaining effective safety and health records as described in this HASP; and
- Coordinating with the site Supervisor(s) and others as necessary for safety and health efforts.

Site Supervisor

The Site Supervisor is responsible for field operations and reports to the Project Manager (PM). The Site Supervisor ensures the implementation of the HASP requirements and procedures in the field. The specific responsibilities of the Site Supervisor include:

- Executing the work plan and schedule as detailed by the PM;
- Coordination with the SHSO on safety and health; and
- Ensuring site work compliance with the requirements of this HASP.

Employees

All Roux employees are responsible for reading and following all provisions of the Corporate Health and Safety Manual, including this HASP. Employees report to the SS at the project Site. Each employee is also responsible for the following:

- Wearing all appropriate PPE as outlined within this HASP;
- Attending all safety meetings;
- Inspecting tools and equipment prior to use, and taking any defective tools or equipment out of service;
- Appropriately documenting field events as they occur within a logbook or equivalent;
- Properly operating machinery and/or equipment only if trained to do so;
- Stopping work operations if unsafe conditions exist;
- Identifying and mitigating hazards when observed;
- Reporting all incidents and near misses to the Roux SHSO and SS immediately; and
- Knowing where emergency equipment is located (e.g., first aid kit, fire extinguisher).

Subcontractors and Visitors

Subcontractors and visitors are responsible for complying with the same health and safety requirements. It is the responsibility of all to make sure subcontractors and visitors comply and uphold the HASP. Subcontractors and visitors have the following additional responsibilities:

- Designating a qualified safety representative for the project that can make the necessary changes in work practices, as necessary;
- Attending all safety meetings while participating in Roux Site work activities;
- Reporting all incidents and near misses to Roux SHSO and SS immediately;
- Conducting initial and periodic equipment inspections in accordance with manufacturer and regulatory guidelines; and
- Providing copies of all Safety Data Sheets (SDS) to Roux SHSO for materials brought to the Site.

2. Background

Relevant background information is provided below, including a general description of the Site; a brief review of the Site's history with respect to hazardous material use, handling, and/or storage; and a review of known and potential releases of hazardous substances at the Site.

2.1 Site Description

The Site location is in the Long Island City neighborhood of Queens, New York. The Site is bounded by Lots 28 and 29, with Center Boulevard to the west, 5th Street to the east, Lot 19 and 50th Avenue to the south, and 49th Avenue to the north. Lot 19, located in the same Block, is not part of the Site and is currently owned by the New York City Metropolitan Transit Authority (NYC MTA) and being used as a fan ventilation plant.

2.2 Site History

The Site included a combined single- and two- story vacant building and parking lot; the building has since been demolished and cleared from the site. A portion of the west side of the Site is vacant and is overgrown by vegetation. The total lot area is 76,000 square feet (sq.ft.) with a lot frontage of 400 ft and depth of 200 ft. According to city records, the original building was built in 1931 and altered in 1987. Most recently, the Site was being used as a warehouse for art storage. At times, from the late 1800s to early 1980s, the Site was being used for varnish and paint manufacturing. The Site currently contains a vacant, undeveloped lot and asphalt/concrete parking lot. The areas surrounding the Site are urban and developed with residential and commercial properties.

2.3 Known and Potential Releases of Hazardous Substances at the Site

Prior to demolishing the single- and two- story building, small quantities of hydraulic fluid containers were observed inside the elevator machine room. The containers were properly stored and in good condition with no evidence of a release. Overgrown vegetation has been observed on the west portion of the Site next to the parking lot where the former west building was located. The asphalt paved parking lot was observed for staining and cracks. The paving was mostly in good condition with some bumps and uneven spots and some staining and cracks were noted.

According to a report from 1996 and 1997, a heating oil tank release resulted in the issuance of Spill number (9704425) on July 15, 1997. A Corrective Action Plan (CAP) was implemented in August 1997, which included the excavation of impacted soil, the removal of the underground storage tank (UST) and the collection of endpoint soil and groundwater samples. Based on the results of the CAP, the spill was closed by NYSDEC on August 13, 1997 and no further remediation was required. No groundwater impacts were documented in groundwater sampling results. Following the spill closure, no additional reporting was deemed necessary.

A Roux Phase II Investigation was conducted between July 20 and 23, 2020. Roux installed ten soil borings (RXSB-1 through RXSB-10), seven of which were converted into temporary monitoring wells (GW-1 through GW-7), and eight temporary soil vapor points (SV-1 through SV-8) throughout the Site. Fill consisting of brick, concrete and asphalt and other miscellaneous materials was found in the upper 7 to 10 ft in all borings across the site. Natural deposits underlying the fill consisted predominantly of fine to medium sand and silt with intermittent peat deposits. Adjacent borings in the north-central part of the site, RXSB-3 and RXSB-7, both encountered impacted soils from 5 to 15 ft bgs. Impacts included odor, staining and elevated PID readings (2,216 ppm at 10 ft in RXSB-3 and 1,921 ppm at 10 ft in RXSB-7). Soil quality in this part of the

site has previously been reported by other investigators. The impacts may be related to two former fuel oil underground storage tanks or it could be related to historic paint and varnish manufacturing and storage operations. Sanborn maps show this area to be the location of the former varnish kettles building. The soil sample results generally indicate that the fill found in the upper 2 ft to 4 ft across the site contains SVOCs, metals and pesticides, which are characteristic of urban fill. These contaminants were detected above Unrestricted Use SCOs and in some cases above Restricted Residential and Commercial SCOs.

Additional Remedial Investigation was conducted between July 12 and August 8, 2021. Roux installed fourteen soil borings (RXSB-11 through RXSB-19), ten of which were converted into permanent monitoring wells (MW-12 through MW-16, MW-18, MW-20, MW-21, MW-25 and MW-26), and six temporary soil vapor points (SV-11, SV-12, SV-15, SV-17, SV-19 and SV-21) throughout the Site.

The Site is covered with 5 to 10 ft of urban fill. Soil samples indicate that the upper 3-4 ft of the fill contains SVOCs (primarily PAHs) and elevated metals (primarily lead and mercury) in exceedance of the SCOs (UUSCO, RRSCO, and/or PGWSCO). In some locations (north of NYC MTA Lot 19 an inside the warehouse), SCO exceedances also occur at lower depths to approximately 9 ft. Soil samples collected at deeper intervals (13-15 ft and 15-17ft) had no exceedances of any compounds. The exceedances found in soil are attributed to typical urban fill across the Site. PFOA and PFOS concentrations were either non-detect or detected below the current NYSDEC guidance values.

Depth to groundwater at the Site varied from 5.15 ft bls to 9.01 ft bls. The direction of groundwater flow is to the west towards the East River. Groundwater samples detected SVOCs (primarily PAHs) exceeding the AWQSGVs in the majority of the samples, however these concentrations most likely reflect adsorbed SVOCs on turbid samples ad don't reflect dissolved concentrations. Limited VOCs were detected in some locations (near the former tank vault excavation area and the former oil storage building) at low to moderate levels. The metals exceedances in groundwater include iron, magnesium, manganese and sodium and are not a concern. PFOA and PFOS were detected at marginal concentrations in all samples.

Soil vapor samples detected a wide range of hydrocarbon compounds in almost every sample. Most of these soil vapor detections were low and were not found in groundwater or soil, with exception of two hydrocarbon VOCs (xylenes and benzene), which were found in groundwater at low concentrations in only two wells (MW-16 and GW-5). MW-16 is located near the former oil storage building at the center of the Site and GW-5 is located on the east side of the Site inside the current warehouse. These VOCs, however, were not found in soil. The chlorinated VOCs TCE and PCE were detected in most samples at low to moderate concentrations across the Site. These compounds were not detected onsite in soil or groundwater. The soil vapor detections are believed to originate from off-Site sources.

3. Scope of Work

The RA scope includes the following:

- Construction oversight of excavation activities:
  - Roux will provide oversite and CAMP monitoring of demolition efforts relating to the removal of the existing concrete/asphalt parking lot remaining onsite, approximately 5,300SF.
- Oversight of Lead stabilization efforts:
  - Roux will provide oversight of Lead stabilization efforts for approximately 2,300 cubic yard of Hazardous lead in soil in accordance with the DEP approved lead stabilization Plan dated June 14, 2022. Sevenson's efforts will include Maectite application to soil, mechanical mixing of soil, staging and disposal; SDS for Maectite is included in **Appendix B**.
- Trucking oversight for soil disposal and backfill importation;
  - Roux will provide oversight during soil staging and disposal efforts of approximately 17,000 CY of soil exceeding UUSCOs to be removed to depths ranging from 6 to 13 feet below grade to achieve a Track 1 Unrestricted Use cleanup across the northern portion of the Site with a cellar.
  - 1,900 CY of soil exceeding RRSCOs to be removed to a depth of 2 feet below grade in the southern portion of the Site with slab on grade to achieve a Track 4 Restricted Residential Use cleanup.
- Implementation of Community Air Monitoring for all dust producing activities; and
- Endpoint samples will be collected in the 2-foot interval below the excavation to confirm objectives are achieved

4. Site Control

This site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft.

4.1 Site Map

A map of this site, showing site boundary and designated work area is provided in Figure 1.

4.2 Site Access

Access to the site is restricted to reduce the potential for exposure to safety and health risks, as well as deter vandalism and theft. Entry and exit into the building will be limited to Roux personnel and drilling subcontractors. Access to the site will be controlled by roll-up garage doors and entrances to the building.

4.3 Buddy System

While working in the Exclusion Zone, site workers use the buddy system. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. The responsibilities of workers using the buddy system include:

- Remaining in close visual contact with partner;
- Providing partner with assistance as needed or requested;
- Observing partner for signs of heat stress or other difficulties;
- Periodically checking the integrity of partner's PPE; and
- Notifying the site manager or other site personnel if emergency assistance is needed.

4.4 Site Communications

The following communication equipment is used to support on-site communication: telephones.

- Cellular telephones will be available for communication with emergency support services/facilities. Each field person is equipped with a cellular telephone and is available for communication with emergency support services. A current list of emergency contact numbers shall be published and posted on-site.

4.5 Site Work Zones

This site is divided into three (3) major zones, described below. These zones are characterized by presence or absence of biological and chemical hazards and the activities performed within them. Zone boundaries are clearly marked at all times and the flow of personnel among the zones is controlled. The site is monitored for changing conditions that may warrant adjustment of zone boundaries. Zone boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, zone markings are also changed, and workers are immediately notified of the change.

Exclusion Zone

The area where contamination exists is the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are considered the EZ. This zone will be clearly delineated by orange high visibility fencing. Safety tape may be used as a secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SHSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy (co-worker);
- Required minimum level PPE;
- Medical Authorization;
- Training certification; and
- Requirement to be in the zone.

Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) is established between the exclusion zone and the support zone. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of personnel and equipment. The CRZ will be used for general Site entry and egress in addition to access for heavy equipment and emergency support services. Personnel are not allowed in the CRZ without:

- A buddy (co-worker)
- Appropriate PPE
- Medical authorization
- Training certification
- Requirement to be in the zone

Support Zone

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. The SZ provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

5. Job Hazard Evaluation

Roux's work at the Site is expected to entail a variety of physical, chemical, and biological hazards, all of which must be sufficiently managed to allow the work to be performed safely. Some of the hazards are Site-specific (i.e., they are associated with the nature, physical characteristics, and/or routine operation of the Site itself) while others are activity-specific (i.e., they are associated with [or arise from] the activity being performed). The various hazards can be grouped into the following categories:

Caught/Crushed – the potential to become caught in, under, between, or by an object or parts of an object, such as equipment with parts that open and close or move up and down ("pinch points") or equipment that rotates, and the accompanying potential to have body parts cut, mangled, or crushed thereby.

Contact – the potential to be struck by or against moving or stationary objects that can cause physical injury, such as heavy machinery, overhead piping, moving vehicles, falling objects, and equipment (including tools and hand-held equipment) or infrastructure with the ability to cut or impale.

Energy Sources – the potential for bodily harm associated with energy sources, most notably electricity, but also including latent energy sources such as compressed air and equipment under tension (which when released could cause injurious contact or a fall).

Ergonomics – the potential for musculoskeletal injury associated with lifting/carrying, pushing/pulling, bending, reaching, and other physical activity attributable to poor body position/mechanics, repetitive motion, and/or vibration.

Exposure – the potential for injury/illness due to physical, chemical, or biological exposures in the work environment, including but not limited to temperature extremes, solar radiation, and noise (physical), chemical splashes and hazardous atmospheres (chemical), and animal/insect bites and poisonous plants (biological).

Falls – the potential to slip or trip and thus fall or drop a load, resulting in bodily injury to oneself or others

The foregoing is intended to provide Roux employees with a general awareness of the hazards involved with Site work. A more detailed review of the potential hazards associated with each specific activity planned for the Site (or on-going activity, as the case may be) is provided in the activity-specific Job Safety Analysis (JSA) forms in **Appendix A**. As can be seen in the JSA forms, the hazards are identified by category per the above, and specific measures designed to mitigate/manage those hazards are also identified. In preparing the JSA forms, all categories of hazards were considered, and all anticipated potential hazards were identified to the extent possible based on the experience of the personnel preparing and reviewing the JSA forms. However, there is always the possibility for an unanticipated hazard to arise, potentially as condition change over the course of the workday. Roux personnel must maintain a continual awareness of potential hazards in the work zone, regardless of whether the hazard is identified in the JSA form. Particular attention should be paid to hazards associated with exposure to hazardous substances (see Table 1 for a listing of the hazardous substances most likely to be encountered in environmental media at the Site) and to Site personnel being located "in the line of fire" with respect to moving equipment, pinch points, and latent energy (e.g., being located or having body parts located within the swing radius of an excavator, between two sections of pipe being connected, below a piece of suspended equipment, or adjacent to a compressed air line).

5.1 Employee Notification of Hazards and Overall Site Information Program

The information in the JSAs and SDSs is made available to all employees and subcontractors who could be affected by it prior to the time they begin their work activities.

Modifications to JSAs are communicated during routine pre-work briefings, and periodically updated as needed in the HASP. SDSs will be maintained by the SHSO/SS for new chemicals brought on-site as needed. Copies of SDSs can be found in **Appendix B**.

5.2 Noise

Noise is associated with the operation of heavy equipment, power tools, pumps, and generators. Noise is also a potential hazard when working near operating equipment such as excavators, drill rigs, or pole drivers. High noise (i.e., < 85 dBA) operations may be evaluated by the SHSO utilizing a type 2 handheld sound level meter (SLM) operating on the "A"-weighted scale with slow response because this scale most closely resembles human response to noise and complies with 29 CFR 1926.52 Occupation Noise Exposure requirements. Roux requires hearing protection in areas with noise exposure greater than 85 dBA. Double hearing protection (ear plugs and earmuffs) are required in areas where the noise exposure is more than 95 dBA. Noise exposure will be controlled by hearing protection as described above or by maintaining setbacks from high-noise equipment, as warranted. Personnel handling heavy equipment and using power tools that produce noise levels exceeding those described above should don hearing protection appropriate (Noise Reduction Rating (NRR) level of hearing protection). Appropriate hearing protection will be evaluated by the SHSO, as necessary, in consultation with the OHSM and CHSD.

5.3 Excavations and Trenching

All trenching and excavation work activities will comply with applicable OSHA standards (i.e., 29 CFR 1926.650-652). Regional Notification Centers (i.e., Underground Services Alert) shall be notified at least two working days prior to the start of any digging or excavation work per New York Part 753.3.1 (NY811). Personnel responsible for excavation activities will be trained in their job responsibilities. Additionally, for trenches 4 feet or deeper where employees will enter, the trench needs to have a stairway, ladder, or other safe means of egress, and located so that employees don't have to travel farther than 25 feet horizontally. Where employees will enter trenches greater than 5 feet deep, the trench must have some type of protective system or sloped sidewalls appropriately to prevent cave-ins.

The SHSO or other responsible Roux personnel will be present on-Site during all Roux contracted excavation and backfill operations and will supplement health and safety monitoring conducted by Subcontractor air quality screening to ensure that appropriate levels of protection and safety procedures are utilized. The proximity of chemical, water, sewer, and electrical lines will be identified by Roux and/or their subcontractor before any subsurface activity or sampling is attempted. Prior to any excavation activities, trees, shrubbery, and other objects that can potentially pose as a hazard during excavation will be supported or removed from the excavation area. The following safe work practices will be implemented during this task:

- The proximity of chemical, water, sewer, and electrical lines will be identified by a facility representative prior to beginning any subsurface activity;
- At the start of every day, a competent person will inspect excavations to evaluate if the area is stable and safe to enter. Inspections will be conducted as needed throughout the excavation operations. If deemed necessary, a competent person may also conduct inspections after rainfall or any other event that can potentially affect the integrity of the excavation. Employees will not enter excavations where water has accumulated until protective measures have been implemented.
- Prior to entering excavations greater than 4 feet in depth, air monitoring for oxygen and hazardous atmospheres must be conducted to assure atmospheric conditions are within normal levels described in Section 7.6. Continuous air monitoring with a standard multi-gas detector (O^2, LEL%, CO, H^2S) shall be used during the course of work within an excavation; if action limits are reached, workers

shall safely exit the excavation. Upgrades to worker protection should be evaluated with the SHSO and PP in consultation with the CHSD. Emergency rescue equipment, such as breathing apparatuses and safety harnesses connected to an extraction device, will be readily available in the event of hazardous atmospheric conditions;

- While earthmoving, stay out of the excavator's delineated heavy equipment exclusion zone and away from the excavation sides where there is potential for cave in (within excavations that are 6 feet or more in depth, a delineated perimeter 6 feet away from the excavated edge is required);
- During loading and unloading operations, stand away from haul trucks and other vehicles to avoid contact with any falling loads; and
- Traffic cones, caution tape, or other barriers will be set up around the perimeter of the excavation when employees are working along the excavation edge and for any excavation that will be left open overnight or unattended for more than two days.

Maximum Allowable Slopes

Soil or Rock Type	Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[3]	
Stable Rock	Vertical	(90°)
Type A[2]	3/4 : 1	(53°)
Type B	1 : 1	(45°)
Type C	1 1/2 : 1	(34°)

29 CFR 1926 Subpart P Appendix B Sloping and Benching Table B-1

Notes:

[1] Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

[2] A short-term maximum allowable slope of 1/2H : 1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 meters) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 meters) in depth shall be 3/4H : 1V (53°).

[3] Sloping or benching for excavations greater than 20 feet deep shall be designed and stamped by a registered professional engineer.

Proper stockpiling (i.e., 2 feet minimum distance from the excavation edge), containment, transport, storage, and disposal practices will be utilized and is dependent upon the potential type and amount of waste generated during operations. The location of safety equipment and evacuation procedures will be established prior to initiation of operations according to this HASP.

5.4 Slip, Trip, and Fall Hazards

Slip, trip, and fall hazards may include, but are not limited to, general slip and trip hazards associated with uneven ground, possible debris, wet grass, and equipment. Prior to work, walking paths will be assessed for solid footings, any ground penetrations that may cause a tripping hazard will be appropriately marked, and other areas will be noted and discussed with the field team.

Personnel shall be aware of their surroundings and footings at all time, and all accommodations should be made for proper housekeeping and organized equipment placement at the Site, where possible, to help prevent any slip, trip, and fall-related incidents. All tools and materials should be appropriately stored when not in use and placed in appropriate storage containers.

5.5 Biological Hazards

Biological hazards that may potentially be present at a Site, include poisonous plants, insects (ticks, spiders, bees), animals (snakes, dogs), etc. Information on biological hazards can be found within Roux's Biological Hazard Awareness Management Program located within Roux's Corporate Health and Safety Manual. There is also the potential for transmission and/or exposure to SARS-CoV-2, the virus that causes COVID-19. Prior to beginning work, on-Site protocols shall be established by the project team, including subcontractors, in accordance with federal, state, county, city, and/or other guidance, as applicable, and consistent with Roux's COVID-19 Interim Health and Safety Guidance, which can be found in **Appendix C**.

6. Emergency Response Plan

This emergency response plan details actions to be taken in the event of site emergencies. The PM and SHSO is responsible for the implementation of emergency response procedures on-Site. The SHSO/PM provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures and notification of appropriate authorities. In the event of an emergency, site personnel are evacuated and do not participate in emergency response activities, response is facilitated through external emergency services.

6.1 Emergency Response

The SHSO, after investigating the incident and relevant information, shall determine the level of response required for containment, rescue, and medical care. Limited on-Site emergency response activities could occur; therefore, the SHSO is responsible for notifying external emergency response agencies. The SHSO provides relevant information to the responding organizations, including but not limited to the hazards associated with the emergency incident, potential containment problems, and missing site personnel.

6.2 Emergency Alerting and Evacuation

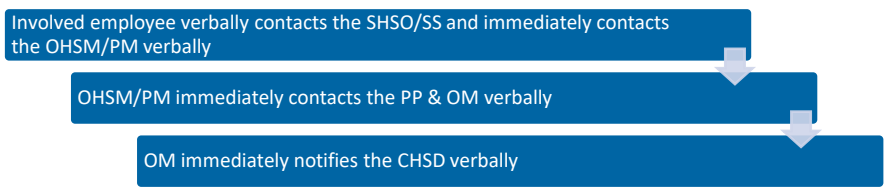
If evacuation notice is given, site workers leave the worksite, if possible, by way of the nearest exit. Appropriate primary and alternate evacuation routes and assembly areas have been identified. The routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by SHSO/PM.

Personnel exiting the site gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given so that appropriate action can be initiated. Subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

6.3 Emergency Medical Treatment and First Aid

In the event of a work-related injury or illness, employees are required to follow procedures outlined below. All work-place injury and illness situations require Roux's Project and Corporate Management Team to be notified when an injury / illness incident occurs, and communication with the contracted Occupational Health Care Management Provider, AllOne Health, is initiated. The Injury/Illness Notification Flowchart is provided below and within Roux's Incident Investigation and Reporting program within Roux's Corporate Health and Safety Manual.

If on-Site personnel require any medical treatment, the following steps will be taken:



1. Notify Roux's Project and Corporate Management Team for any work-related injury and/or illness occurrence and communicate with the contracted Occupational Health Care Management Provider, AllOne Health, immediately following the notifications provided above.
2. Based on discussions with the Project Team, Corporate Management, and the AOH evaluation, if medical attention beyond on-Site First Aid is warranted, transport the injured / ill person (IP) to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications with Corporate Management Team. A Hospital Route and Urgent Care map with location to New York Presbyterian Hospital/ Forest Urgent Care is included in Figures 2 and 3 respectively.
3. Decontaminate to the extent possible prior to administration of first aid or movement to medical or emergency facilities.
4. First aid medical support will be provided by onsite personnel trained and certified in First Aid, Cardio Pulmonary Resuscitation (CPR), Automatic External Defibrillation (AED), and Blood-Borne Pathogens (BBP) Awareness, until relieved by emergency medical services (EMS).
5. The SHSO and Project Manager will perform a Loss Investigation (LI) and the Project Team will complete the final Loss Report. If a Roux employee is involved in a vehicular incident, the employee must also complete the Acord Automobile Loss Notice.

6.4 Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO or project principal will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related conditions.
- Limited visibility.
- Electrical storm potential.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain, fog, high winds, and lightning. Observe daily weather reports and evacuate in case of inclement weather conditions, if necessary.

6.5 Electrical Storm Guidelines

If lightning and/or thunder are observed while working on-Site, all on-Site activities shall stop and personnel shall seek proper shelter (e.g., substantial building, enclosed vehicle, etc.). Work shall not resume until the threat of lighting has subsided and no lightning or thunder has been observed for 30 minutes. If the possibility of lightning is forecasted for the day, advise the on-Site personnel on the risks and proper procedure at the pre-work safety briefing. Continuously monitor for changing weather conditions and allow enough time to properly stop work if lightning is forecast.

7. Safety Procedures

This section of the HASP presents the specific safety procedures to be implemented during Roux's activities at the Site in order to protect the health and safety of various on-site personnel. Minimum OSHA-mandated procedures are presented first, followed by client- and Site-specific procedures. Lastly, activity-specific procedures are discussed. These Site- and activity-specific procedures supplement the general safety procedures included in Roux's Corporate Health and Safety Manual, which also must be followed in their entirely.

7.1 Training

At a minimum, Site personnel who will perform work in areas where there exists the potential for toxic exposure will be health and safety-trained prior to performing work on the Site per OSHA 29 CFR 1910.120(e) and 29 CFR 1926.65(e). More specifically, all Roux, subcontractor, and other personnel engaged in sampling and remedial activities at the Site and who are exposed or potentially exposed to hazardous substances, health hazards, or safety hazards must have received at a minimum the 40 hour initial HAZWOPER training consistent with the requirements of 29CFR 1910.120(e)(3)(i) training and a minimum of 3 days' actual field experience under the direct supervision of a trained experienced supervisor, plus 8 hours of refresher training on an annual basis. Depending on tasks performed, less training may be permitted. Evidence of such training must always be maintained at the Site. Furthermore, all on-Site management and supervisory personnel directly responsible for or who supervise the employees engaged in Site remedial operations, must have received an additional 8 hours of specialized training at the time of job assignment on topics including, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques, plus 8 hours of refresher training on an annual basis.

Roux personnel training records are maintained in a corporate database with records available upon request from either the OHSM/SHSO/CHSD or Human Resources Department.

7.2 Site-Specific Safety Briefings for Visitors

A Site-specific briefing is provided to all site visitors who enter this site beyond the site entry point. For visitors, the Site-specific briefing provides information about site hazards; the site lay-out, including work zones and places of refuge; the emergency alarm system and emergency evacuation procedures; and other pertinent safety and health requirements as appropriate.

7.3 HASP Information and Site-Specific Briefings for Workers

Site personnel review this HASP and are provided a Site-specific tailgate briefing prior to the commencement of work to ensure that employees are familiar with this HASP and the information and requirements it contains as well as relevant JSAs. Additional briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which we schedule additional briefings include but are not limited to: changes in site conditions, changes in the work schedule/plan, newly discovered hazards, and incidents occurring during site work.

7.4 Medical Surveillance

The medical surveillance section of the Health and Safety Plan describes how worker health status is monitored at this site. Medical surveillance is used when there is the potential for worker exposure to

hazardous substance at levels above OSHA permissible exposure limits or other published limits. The purpose of a medical surveillance program is to medically monitor worker health to ensure that personnel are not adversely affected by site hazards.

7.4.1 Site Medical Surveillance Program

Medical surveillance requirements are based on a worker's potential for exposure as determined by the site characterization and job hazard analysis documented in Section 4 and JSAs within Appendix A of this HASP and in compliance with the requirements of 29 CFR 1910.120(f)(2). Based on site information and use of direct reading instruments, limited use of respirators (less than 30 days per year), and the absence of an employee-staffed HAZMAT team, a limited medical surveillance program is required and implemented at this site. The medical surveillance program provides that:

1. Workers assigned to tasks requiring the use of respirators receive medical examinations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable to perform the work and use the equipment.
2. If a worker is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substance or health hazards, medical examinations are provided to that worker as soon as possible after the occurrence and as required by the attending physician.
3. These medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to workers free of cost, without loss of pay, and at a reasonable time and place. In addition, the need to implement a more comprehensive medical surveillance program will be re-evaluated after any apparent over-exposure.

7.4.2 Medical Recordkeeping Procedures

Medical recordkeeping procedures are consistent with the requirements of 29 CFR 1910.1020 and are described in the company's overall safety and health program. A copy of that program is available at our Islandia, New York office.

The following items are maintained in worker medical records:

- Respirator fit test and selection;
- Physician's medical opinion of fitness for duty (pre-placement, periodic, termination);
- Physician's medical opinion of fitness for respirator protection (pre-placement, periodic); and
- Exposure monitoring results.

7.4.3 Program Review

The medical program is reviewed to ensure its effectiveness. The Corporate Health and Safety Manager, in coordination with the Human Resources Director, is responsible for this review. At minimum, this review consists of:

- Review of accident and injury records and medical records to determine whether the causes of accidents and illness were promptly investigated and whether corrective measures were taken wherever possible;
- Evaluation of the appropriateness of required medical tests based on site exposures; and
- Review of emergency treatment procedures and emergency contacts list to ensure they were site-specific, effective, and current.

7.5 Personnel Protection

Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices and PPE are used to protect employees. Appropriate personal protective equipment (PPE) shall be worn by Site personnel when there is a potential exposure to chemical hazards or physical hazards (e.g., falling objects, flying particles, sharp edges, electricity, and noise [Appendix B]), as determined by the SHSO, and described in the Personal Protective Equipment Program attached as Appendix D. The level of personal protection, type, and kind of equipment selected will depend on the hazardous conditions and in some cases cost, availability, compatibility with other equipment, and performance. An accurate assessment of all these factors will be made before work can be safely executed.

Roux maintains a comprehensive written PPE program that addresses proper PPE selection, use, maintenance, storage, fit, and inspection. PPE to be used at the Site will meet the appropriate American National Standards Institute (ANSI) standards and the following OSHA (General Industry) standards for minimum PPE requirements.

The minimum level of PPE for entry onto the Site is Level D. The following equipment shall be worn:

- Work uniform (long pants, sleeved shirt);
- Hard hat;
- Steel or composite toe work boots (must comply with American Society for Testing and Materials [ASTM]) F 2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection);
- Safety Glasses (must comply with one of the following ANSI/ISEA Z87.1-2010, ANSI Z87.1-2003, ANSI Z87.1-2003);
- Boot Covers (as needed);
- Hearing Protection (as needed);
- High visibility clothing (shirt/vest); and
- Hand Protection (e.g., minimum cut resistance meeting ANSI 105-2000 Level 2).

Note that jewelry shall be removed or appropriately secured to prevent it from becoming caught in rotating equipment or unexpectedly snagged on a fixed object. (e.g., wrist watches, bracelets, rings, chains and necklaces, open earrings). Do not wear loose clothing and all shoulder length hair should be tied back.

Site specific PPE ensembles and materials are identified within task specific JSAs located within Appendix A, and any upgrades or downgrades of the level of protection (i.e., not specified in the JSA) must be immediately communicated to all Roux personnel and subcontractors as applicable. PPE is used in accordance with manufacturer's recommendations.

7.6 Monitoring

An air monitoring program is important to the safety of on- and off-Site personnel. A preliminary survey, to establish background conditions in the immediate sampling area, may be made prior to the initiation of Site work including, but not limited to, monitoring wind direction and approximate temperature during all invasive site activities. This survey will be conducted with the appropriate air monitoring instrument(s) as warranted by the field activity. Once this survey has been complete, any change in the type of PPE will be determined.

Air monitoring may be performed to verify that the proper level of equipment is used and to determine if increased protection or work stoppage is required. The following equipment may be used to monitor conditions:

- A Photoionization Detector (PID) with a lamp energy of 10.6 eV will be used to provide direct readings of organic vapor concentrations during intrusive activities to determine that personnel protection is adequate. Concentrations shall be recorded during intrusive activities with the potential to encounter contaminant vapors.
- A pre-calibrated multi-gas meter with combustible Lower Explosive Limit (LEL), oxygen (O_2), carbon monoxide (CO), and hydrogen sulfide (H_2S) sensors shall be used to monitor the potential for oxygen-deficient atmospheres, explosive concentrations of organic vapors, and toxic gases during intrusive operations. The calibration for this device will be performed using a known gas composition calibration mixture.

Monitoring equipment will be calibrated in accordance with applicable regulatory requirements and manufacturer specifications.

Below are monitoring action levels for Site-specific chemicals of concern. In the event that PID readings above the thresholds identified below are sustained for 5 minutes in the breathing zone, worker protection will require upgrading following notification to the OHSM and applicable parties (e.g., client, board of health, regulators, etc.).

Air Monitoring Summary and Action Levels Organic Vapors	
PID Reading in Breathing Zone (ppm)	**Action**
<5 ppm	Continue Monitoring, ventilate space
≥ 5 ppm - ≤ 25 ppm	Ventilate space until PID reads < 5 ppm. If < 5 ppm cannot be achieved, upgrade to Level C[1].
≥ 25 ppm	Ventilate space and evacuate area.

Background concentrations should be established at the beginning of each work day. It may be necessary to re-establish background concentrations and ambient conditions vary through the day.

[1] Measured air concentrations of known organic vapors will be reduced by the respirator to one half of the PEL or lower, and the individual and combined compound concentrations shall be within the service limit of the respirator cartridge.

Air Monitoring Summary and Action Levels Oxygen	
O_2 Reading in Breathing Zone (%)[1]	**Action**
20.9% O_2	Oxygen level normal
< 19.5% O_2	Oxygen deficient Interrupt task/Evacuate area
>23.5% O_2	Oxygen enriched Interrupt task/Evacuate area

1. Action levels based on USEPA Standard Operating Safety Guides; Table 5-1, Atmospheric Hazard Action Guidelines may be further restricted based on the CHSD's professional judgment and experience.

Air Monitoring Summary and Action Levels Carbon Monoxide	
CO Reading in Breathing Zone (ppm)[1]	**Action**
<12.5 ppm	Inspect exhaust system for leaks or other sources of CO. Monitor initially and every 15 minutes during use of CO-generating equipment.
12.5-25 ppm	Ventilate area. Monitor continuously and record measurements. Contact PM.
>25 ppm	Cease Field Operations. Ventilate area.

1. Based upon the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 25 ppm as an 8-hour time weighted average (TWA) and OSHA's Permissible Exposure Limit (PEL) of 50 ppm as an 8-hour TWA concentration.

Air Monitoring Summary and Action Levels Combustible Gases	
Lower Explosive Limit (LEL) Reading	**Action**
< 4% LEL	Site activities will continue with normal monitoring
4% – 20% LEL	Stop work until levels dissipate to <4% LEL
> 20% LEL	Potential explosion hazard. Halt all site activities, research source of release, aerate work area, suppress source.

Air Monitoring Summary and Action Levels Hydrogen Sulfide	
Hydrogen Sulfide (H_2S) Reading	**Action**
<10 ppm	Site activities will continue with normal monitoring
≥10 ppm	Stop work until levels dissipate to <10 ppm; use mechanical ventilation if possible. Consult with CHSD if unable to reduce concentrations below 10 ppm.

7.6.1 Air Monitoring Equipment and Calibration

A PID calibrated to an appropriate calibration mixture will be used to detect organic vapors in and around the work areas. Monitoring will be conducted in and around all work areas and at the workers breathing zone before activities commence to establish a background level, then at 15-minute intervals throughout the day. All equipment will be calibrated according to the manufacturer's recommendation. A calibration log will be maintained and will include the name of the person who performed the calibration, the date and time calibrated, and the instrument reading at the time of calibration.

If air monitoring data indicate safe levels of potentially harmful constituents at consistent intervals (5-minute intervals), then monitoring can be conducted less frequently (every 30 minutes). This determination will be made by the on-Site SHSO. Monitoring data, including background readings and calibration records, will be documented. Work to be performed on-Site will conform to Roux's Standard Operating Procedures (SOPs). Conformance with these guidelines as well as the guidelines described in this HASP will aid in mitigating the physical and chemical hazards mentioned throughout this HASP.

7.7 Tailgate Safety Meetings

A designated Site worker will provide daily safety briefings (e.g., tailgate meetings) including, but not limited to, the following scenarios:

- When new operations are to be conducted;
- Whenever changes in work practices must be implemented; and
- When new conditions are identified and/or information becomes available.

Daily safety briefings shall be recorded on the Roux Daily Tailgate Health and Safety Meeting Log/Daily Site Safety Checklist, and all completed forms will become a part of the project file.

7.8 Spill Containment

Spill containment equipment and procedures should, at a minimum, meet the requirements of the facility's Spill Prevention, Control and Countermeasure Plan, if applicable. Otherwise, spill containment equipment and procedures must be considered depending on the task including, but no limited to, chemical/product transfer points and handling.

At a minimum all spills of petroleum products of 5 or more gallons shall be reported to NYSDEC Spill Hotline at 1-800-457-7362.

7.8.1 Initial Spill Notification and Response

Any worker who discovers a hazardous substance spill will immediately notify the Project Manager, Alexander Policastro. The worker will, to his/her best ability, report the hazardous substance involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, and any associated injuries without compromising their own safety.

7.8.2 Spill Evaluation and Response

Alexander Policastro, Project Manager, is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area will be isolated and demarcated to the extent possible. If necessary, to protect nearby community members, notification of the appropriate authorities is made by the PM as appropriate. On-site response is limited to small spills (e.g., <10 gallons), large spills require external emergency responders who will be contacted by the SHSO.

7.9 Decontamination

The decontamination section of the HASP describes how personnel and equipment are decontaminated when they leave the Exclusion Zone. This section also describes how residual waste from decontamination processes is disposed. The site decontamination procedures are designed to achieve an orderly, controlled removal or neutralization of contaminants that may accumulate on personnel or equipment. These

procedures minimize worker contact with contaminants and protect against the transfer of contaminants to clean areas of the site and off-site. They also extend the useful life of PPE by reducing the amount of time that contaminants contact and can permeate PPE surfaces. Decontamination is facilitated within the contamination reduction zone at this site.

7.9.1 Decontamination Procedures for Personnel and PPE

The following are general decontamination procedures established and implemented at this site.

1. Decontamination is required for all workers exiting a contaminated area. Personnel may re-enter the Support Zone after undergoing the decontamination procedures described below in the next section, as necessary.
2. Protective clothing is decontaminated, cleaned, laundered, maintained, and/or replaced as needed to ensure its effectiveness.
3. PPE used at this site that requires maintenance or parts replacement is decontaminated prior to repairs or
4. PPE used at this site is decontaminated or prepared for disposal on the premises. Personnel who handle contaminated equipment have been trained in the proper means to do so to avoid hazardous exposure.
5. This site uses an off-site laundry for decontamination of PPE. The site has informed that facility of the hazards associated with contaminated PPE from this site.
6. The site requires and trains workers that if their permeable clothing is splashed or becomes wetted with a hazardous substance, they will immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing.
7. Procedures for disposal of decontamination waste meet applicable local, State, and Federal regulations.

7.9.2 Decontamination Procedures for Equipment

All tools, equipment, and machinery from the Exclusion Zone or CRZ are decontaminated in the CRZ prior to removal to the Support Zone. Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure and to avoid cross-contamination and chemical incompatibilities.

General Equipment Decontamination Procedures:

1. Decontamination is required for all equipment exiting a contaminated area. Equipment may re-enter the Support Zone only after undergoing the equipment decontamination procedures.
2. Vehicles that travel regularly between the contaminated and clean areas of the site are carefully decontaminated each time they exit the Exclusion Zone and the effectiveness of that decontamination is monitored to reduce the likelihood that contamination will be spread to other parts of the site.
3. Particular attention is given to decontaminating tires, scoops, and other parts of heavy equipment that are directly exposed to contaminants and contaminated soil.

The following items may be used to decontaminate equipment:

- Fresh water rinse;
- Non-phosphorus detergent wash;
- Acetone rinse;

- Distilled water rinse; and
- A steam cleaner or pressure washer (heavy equipment only).

7.9.3 Monitoring the Effectiveness of Decontamination Procedures

Visual examination and sampling are used to evaluate the effectiveness of decontamination procedures. Visual examination is used to ensure that procedures are implemented as described and that they appear to control the spread of contaminants under changing site conditions. Visual examination is also used to inspect for signs of residual contamination or for contaminant permeation of PPE.

Personnel who work in contaminated areas of the site, either the Contamination Reduction Zone (CRZ) or the Exclusion Zone, are trained in the principles and practices of decontamination described in this section of the HASP and in related SOPs. If site procedures are changed as a result of inspection and monitoring, all affected employees are notified of these changes.

7.10 Confined Space Entry

The following is a list of the safety requirements for confined space entry at the Site:

- **ROUX PERSONNEL ARE NOT AUTHORIZED TO ENTER AN OSHA PERMIT REQUIRED CONFINED SPACE;**
- Currently the scope of work **DOES NOT** require personnel to enter permitted confined space for this project; and
- Any changes to the field activities that may necessitate confined space entry will be reported to the Project Principal and OHSM.

Confined space is defined as any space, depression, or enclosure that:

- Has limited opening for entry and egress;
- Is large enough for and employee to enter and perform assigned work; and
- Is not intended for continuous occupancy.

A permit required confined space is one that meets the definition of a confined space and has one or more of the following characteristics:

- May contain or produce life-threatening atmospheres due to oxygen deficiency the presence of toxic, flammable, or corrosive contaminants;
- Contains a material that has the potential for engulfment;
- Has an internal configuration that may cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section; and
- Contains any other serious safety or health hazards.

Although Roux personnel will not perform confined space entry, it is expected that subcontractors performing cleaning and mitigation and/or remedial measures activities may be required to enter structures that are considered to be a permit required confined space. Permitting of the confined space as well as hazard mitigation for entry will be completed by the subcontractor in accordance with 1910.146.

7.11 Client and Site-Specific

In addition to the OSHA-specific procedures discussed above, there may be client and site-specific safety procedures that must be adhered to during the performance of remedial activities at the Site.

7.12 Unusual or Significant Risks

Field activities that appear to have unusual or significant risks that cannot be adequately managed with existing risk tools such as LPS, HASPs, traffic safety plans, work permits, design and O&M practices, equipment HAZOPS or other safety tools must be referred to the CHSD to help with the assessment and management of the associated potential safety risks. Examples include the use of explosives for demolition, use of firearms to control wildlife, rappelling, demolition over water, etc.

7.13 Activity-Specific

In addition to the general hazards discussed above, there are activity-specific hazards associated with each work activity planned for the Site. An activity specific JSA has been completed for each of the activities planned for the Site. JSAs are provided in Appendix A. If new work activities or tasks are planned, JSAs will be developed and implemented prior to performing the new activities. In the absence of a JSA, the personnel performing work must prepare a field JSA and receive clearance from a designated competent safety official prior to performing any task with significant risk. In emergency situations where time is critical SPSAs will be utilized to identify the task, associated hazards and mitigative actions to take. For lower risk activities (as deemed by the discretion of a Competent Person) where a JSA is determined to not be needed, the individual(s) conducting the activities must perform SPSAs prior to and during the work.

7.13.1 Heavy Equipment

Use of heavy equipment at the Site will require adherence to Roux's Corporate Heavy Equipment Exclusion Zone Management Program found within **Appendix E**. Additionally, operation of the drill rig/other heavy equipment will maintain clearances from overhead power lines in accordance with OSHA 29 CFR1926.1408 Table A Minimum Clearance Distances provided below.

Minimum Required Clearances for Energized Overhead Power Lines

Nominal System Voltage of Power Line (K V)	Minimum Required Clearance (feet)
0-50	10
51-100	12
101-200	15
201-300	20
301-500	25
501-750	35
751-1000	45

1 kilovolt (KV) = 1,000 volts

7.13.2 Subsurface Work

Subsurface work activities will require adherence to Roux's Corporate Subsurface Utility Clearance Management program found within **Appendix F**.

7.14 Heat Stress

The National Oceanic and Atmospheric Administration records average minimum/maximum temperatures of 40°-79° Fahrenheit during the year in Queens, NY

7.14.1 Heat Stress

Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment in hot weather environments. Heat cramps are brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body resulting in painful muscle cramps. The signs and symptoms of heat stress are as follows:

- Severe muscle cramps, usually in the legs and abdomen;
- Exhaustion, often to the point of collapse; and
- Dizziness or periods of faintness.

First aid treatment includes, but is not limited to, shade, rest, and fluid replacement. Typically, the individual should recover within one-half hour while being monitored constantly. If the individual has not improved substantially within 30 minutes and the body temperature has not decreased, the individual should be transported to a hospital for medical attention.

7.14.2 Heat Exhaustion

Heat exhaustion may occur in a healthy individual who has been exposed to excessive heat while working or exercising. The circulatory system of the individual fails as blood collects near the skin to rid the body of excess heat through transference. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Skin appears pale;
- Fatigue and weakness;
- Dizziness; and
- Elevated body temperature.

First aid treatment includes, but is not limited to, cooling the victim, elevating the feet, and replacing fluids.

If the individual is not substantially improved within 30 minutes and the body temperature has not decreased, the individual should be transported to the hospital for medical attention.

7.14.3 Heat Stroke

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a MEDICAL EMERGENCY requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot red skin;
- Body temperature approaching or above 105 degrees F;

- Confusion, altered mental state, slurred speech;
- Seizures;
- Large (dilated) pupils; and
- Loss of consciousness – the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility. Heat stress is a significant hazard if any type of protective equipment (semi-permeable or impermeable) that prevents evaporative cooling when worn in hot weather environments.

8. Field Team Review

Each person performing work at or visiting this site shall sign this section after site-specific training is completed and before being permitted to access the CRZ or Exclusion Zone.

I have read and understand this Site-Specific Health and Safety Plan. I will comply with the provision contained therein.

Site/Project: 2-33 50th Avenue, Long Island City, New York 11101.

Name Printed	Signature	Date

9. Approvals

By their signature, the undersigned certify that this HASP is approved and will be utilized at 2-33 50th Avenue, Long Island City, New York 11101.

TBD – Site Health and Safety Officer	Date
Brian Hobbs, CIH, CSP – Corporate Health and Safety Director	Date
Alexander Policastro, PE – Project Manager	Date
Craig Werle – Principal Hydrogeologist	Date

TABLE

Toxicological Properties of Hazardous Substances Present at the Site

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
VOLATILE ORGANIC COMPOUNDS (VOCs)									
1,1,1-Trichloroethane	71-55-6	TWA 350 ppm STEL 450 ppm	C 350 ppm (1900 mg/m^3) [15-minute]	TWA 350 ppm (1900 mg/m^3)	700 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eyes, skin, central nervous system, cardiovascular system, liver	Colorless liquid with a mild, chloroform-like odor. BP: 165°F Fl.Pt. = NA LEL: 7.5% UEL: 12.5% Combustible Liquid, but burns with difficulty
1,1,2,2-Tetrachloroethane	79-34-5	TWA 1 ppm	Ca TWA 1 ppm (7 mg/m^3)	TWA 5 ppm (35 mg/m^3)	Ca [100 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tenderness; dermatitis; leukocytosis (increased blood leukocytes); kidney damage; [potential occupational carcinogen]	Skin, liver, kidneys, central nervous system, gastrointestinal tract	Colorless to pale-yellow liquid with a pungent, chloroform-like odor BP: 296°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Liquid
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	TWA 1000 ppm STEL 1250 ppm	TWA 1000 ppm (7600 mg/m3) ST 1250 ppm (9500 mg/m3)	TWA 1000 ppm (7600 mg/m3)	2000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation skin, throat, drowsiness, dermatitis; central nervous system depression; In Animals: cardiac arrhythmias, narcosis	Skin, heart, central nervous system, cardiovascular system	Colorless to water-white liquid with an odor like carbon tetrachloride at high concentrations. [Note: A gas above 118°F.] BP: 118°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Liquid at ordinary temperatures, but the gas will ignite and burn weakly at 1256°F.
1,1,2-Trichloroethane	79-00-5	TWA 10 ppm	Ca TWA 10 ppm (45 mg/m3) [skin]	TWA 10 ppm (45 mg/m3)	Ca [100 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen]	Eyes, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, chloroform-like odor BP: 237°F Fl.Pt. = NA LEL: 6% UEL: 15.5% Combustible Liquid, forms dense soot
1,1-Dichloroethane	75-34-3	TWA 100 ppm	TWA 100 ppm (400 mg/m^3)	TWA 100 ppm (400 mg/m^3)	3,000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation skin; central nervous system depression; liver, kidney, lung damage	Skin, liver, kidneys, lungs, central nervous system	Colorless, oily liquid with a chloroform-like odor. BP: 135°F Fl.Pt. = 2°F LEL: 5.4% UEL: 11.4% Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F.
1,1-Dichloroethene	75-35-4	TWA 5 ppm	Ca	None	Ca	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor BP: 89°F Fl.Pt. = -2°F LEL: 6.5% UEL: 15.5% Class IA Flammable Liquid: Fl.P. below 73°F and BP below 100°F
1,2,3-Trichlorobenzene	87-61-6	Cameo Chemicals Source https://cameochemicals.noaa.gov/chemical/10051				Inhalation, skin absorption, ingestion, skin and/or eye contact	Inhalation may cause irritation of respiratory tract. Irritating to the eyes. May redden skin on contact. Ingestion may cause liver damage.	Skin, eyes, respiratory tract, liver	A white solid with a sharp chlorobenzene odor. Insoluble in water and denser than water. Hence sinks in water Fl.Pt. = 234.9°F
1,2,4-Trichlorobenzene	120-82-1	STEL C 5 ppm	C 5 ppm (40 mg/m3)	None	N.D.	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin, mucous membrane; In Animals: liver, kidney damage; possible teratogenic effects	Eyes, skin, respiratory system, liver, reproductive system	Colorless liquid or crystalline solid (below 63°F) with an aromatic odor BP: 416°F Fl.Pt. = 222°F LEL (302°F): 2.5% UEL (302°F): 6.6% Class IIIB Combustible Liquid: Fl.P. at or above 200°F. Combustible Solid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,2-Dibromo-3-chloropropane	96-12-8		Ca	[1910.1044] TWA 0.001 ppm	Ca	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; drowsiness; nausea, vomiting; pulmonary edema; liver, kidney injury; sterility; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys, spleen, reproductive system, digestive system	Dense yellow or amber liquid with a pungent odor at high concentrations. [pesticide] [Note: A solid below 43°F.] BP: 384°F Fl.Pt. = (oc) 170°F LEL: NA UEL: NA Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.
1,2-Dibromoethane	106-93-4	None listed	Ca TWA 0.045 ppm C 0.13 ppm [15-minute]	TWA 20 ppm C 30 ppm 50 ppm [5-minute maximum peak]	Ca [100 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system; dermatitis with vesiculation; liver, heart, spleen, kidney damage; reproductive effects; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys, reproductive system	Colorless liquid or solid (below 50°F) with a sweet odor. [fumigant] BP: 268°F Fl.Pt. = 50°F LEL: NA UEL: NA Noncombustible Liquid
1,2-Dichlorobenzene	95-50-1	TWA 25 ppm STEL 50 ppm	C 50 ppm (300 mg/m3)	C 50 ppm (300 mg/m3)	200 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; liver, kidney damage; skin blisters	Eyes, skin, respiratory system, liver, kidneys	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide] BP: 357°F Fl.Pt. = 1°F LEL: 2.2% UEL: 9.2% Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.
1,2-Dichloroethane	107-06-2	TWA 10 ppm	Ca TWA 1 ppm (4 mg/m3) ST 2 ppm (8 mg/m3)	TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]	Ca [50 ppm]	Inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.] BP: 182°F Fl.Pt. = 56°F LEL: 6.2% UEL: 16% Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F.
1,2-Dichloropropane	78-87-5	TWA 10 ppm	Ca	TWA 75 ppm (350 mg/m3)	Ca [400 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system; drowsiness, dizziness; liver, kidney damage; In Animals: central nervous system depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Colorless liquid with a chloroform-like odor. [pesticide] BP: 206°F Fl.Pt. = 60°F LEL: 3.4% UEL: 14.5% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
1,3-Dichlorobenzene	541-73-1	https://cameochemicals.noaa.gov/chemical/8514				Inhalation, skin absorption, ingestion, skin and/or eye contact	INHALATION: Causes headache, drousiness, unsteadiness. Irritating to mucous membranes. EYES: Severe irritation. SKIN: Severe irritation. INGESTION: Irritation of gastric mucosa, nausea, vomiting, diarrhea, abdominal cramps and cyanosis.		Colorless liquid. Sinks in water. BP: 343°F Fl.Pt. = 146°F LEL: 2.02% UEL: 9.2%
1,4-Dichlorobenzene	106-46-7	TWA 10 ppm	Ca	TWA 75 ppm (450 mg/m3)	Ca [150 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; In Animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin	Colorless or white crystalline solid with a mothball-like odor. [insecticide] BP: 345°F Fl.Pt. = 150°F LEL: 2.5% UEL: NA Combustible Solid, but may take some effort to ignite.
1,4-Dioxane	123-91-1	TWA 20 ppm	Ca C 1 ppm (3.6 mg/m3) [30-minute]	TWA 100 ppm (360 mg/m3) [skin]	Ca [500 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin, nose, throat; drowsiness, headache; nausea, vomiting; liver damage; kidney failure; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys	Colorless liquid or solid (below 53°F) with a mild, ether-like odor. BP: 214°F Fl.Pt. = 55°F LEL: 2.0% UEL: 22% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
2-Butanone	78-93-3	TWA 200 ppm STEL 300 ppm	TWA 200 ppm (590 mg/m3) ST 300 ppm (885 mg/m3)	TWA 200 ppm (590 mg/m3)	3000 ppm	inhalation, ingestion, skin and/or eye contact	irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor BP: 175°F Fl.Pt. = 16°F LEL (200°F): 1.4% UEL (200°F): 11.4% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F
2-Hexanone	591-78-6	TWA 5 ppm STEL 10 ppm	TWA 1 ppm (4 mg/m3)	TWA 100 ppm (410 mg/m3)	1600 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness	Eyes, skin, respiratory system, central nervous system, peripheral nervous system	Colorless liquid with an acetone-like odor BP: 262°F Fl.Pt. = 77°F LEL: NA UEL: 8.0% Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F
4-Methyl-2-pentanone	108-10-1	TWA 20 ppm STEL 75 ppm	TWA 50 ppm (205 mg/m3) ST 75 ppm (300 mg/m3)	TWA 100 ppm (410 mg/m3)	500 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; In Animals: liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a pleasant odor BP: 242°F Fl.Pt. = 64°F LEL (200°F): 1.2% UEL (200°F): 8.0% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F
Acetone	67-64-1	TWA 250 ppm STEL 500 ppm	TWA 250 ppm (590 mg/m^3)	TWA 1000 ppm (2400 mg/m^3)	2500 ppm [10% LEL]	Inhalation, ingestion, skin and/or eye contact	irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, mint-like odor BP: 133°F Fl.Pt. = 0°F LEL: 12.8% UEL: 2.5% Class IB Flammable liquid: Fl.P. below 73°F and BP at or above 100°F.
Benzene	71-43-2	TWA 0.5 ppm STEL 2.5 ppm	Ca TWA 0.1 ppm ST 1 ppm	TWA 1 ppm ST 5 ppm	Ca [500 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, central nervous system, bone marrow	Colorless to light yellow liquid with an aromatic odor [Note: Solid below 42 °F] BP: 176°F Fl.Pt. = 12°F LEL: 1.2% UEL: 7.8% Class IB Flammable liquid. Fl.P. below 73°F and BP at or above 100°F.
Bromochloromethane	74-97-5	TWA 200 ppm	TWA 200 ppm (1050 mg/m3)	TWA 200 ppm (1050 mg/m3)	2000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; confusion, dizziness, central nervous system depression; pulmonary edema	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Colorless to pale-yellow liquid with a chloroform-like odor. [Note: May be used as a fire extinguishing agent.] BP: 155°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Liquid
Bromodichloromethane	75-27-4	https://cameochemicals.noaa.gov/chemical/16064				Inhalation, ingestion, skin and/or eye contact	Symptoms of exposure to this compound may include irritation of the skin, eyes, mucous membranes and respiratory tract. It may also cause narcosis. Other symptoms may include nausea, dizziness and headache.	Liver and kidney damage. Central nervous system effects may also occur.	Clear colorless liquid BP: 189°F Fl.Pt. = NA LEL: NA UEL: NA
Bromoform	75-25-2	TWA 0.5 ppm	TWA 0.5 ppm (5 mg/m3) [skin]	TWA 0.5 ppm (5 mg/m3) [skin]	850 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system; central nervous system depression; liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless to yellow liquid with a chloroform-like odor. [Note: A solid below 47°F.] BP: 301°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Bromomethane	74-83-9	TWA 1 ppm	Ca	C 20 ppm (80 mg/m3) [skin]	Ca [250 ppm]	Inhalation, skin absorption (liquid), skin and/or eye contact (liquid)	Irritation eyes, skin, respiratory system; muscle weak, incoordination, visual disturbance, dizziness; nausea, vomiting, headache; malaise (vague feeling of discomfort); hand tremor; convulsions; dyspnea (breathing difficulty); skin vesiculation; liquid: frostbite; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system	Colorless gas with a chloroform-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.] BP: 38°F Fl.Pt. = NA (Gas) LEL: 10% UEL: 16.0% Flammable Gas, but only in presence of a high energy ignition source.
Carbon disulfide	75-15-0	TWA 1 ppm	TWA 1 ppm (3 mg/m3) ST 10 ppm (30 mg/m3) [skin]	TWA 20 ppm C 30 ppm 100 ppm (30-minute maximum peak)	500 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	Central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system	Colorless to faint-yellow liquid with a sweet ether-like odor. [Note: Reagent grades are foul smelling.] BP: 116°F Fl.Pt. = -22°F LEL: 1.3% UEL: 50.0% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
Carbon tetrachloride	56-23-5	TWA 5 ppm STEL 10 ppm	Ca ST 2 ppm (12.6 mg/m3) [60-minute]	TWA 10 ppm C 25 ppm 200 ppm (5-minute maximum peak in any 4 hours)	Ca [200 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]	Central nervous system, eyes, lungs, liver, kidneys, skin	Colorless liquid with a characteristic ether-like odor BP: 170°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Liquid
Chlorobenzene	108-90-7	TWA 10 ppm	TWA 75 ppm	TWA 75 ppm (350 mg/m3)	1000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; In Animals: liver, lung, kidney injury	Eyes, skin, respiratory system, central nervous system, liver	Colorless liquid with an almond-like odor BP: 270°F Fl.Pt. = 82°F LEL: 1.3% UEL: 9.6% Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.
Chloroethane	75-00-3	TWA 100 ppm	Handle with caution in the workplace	TWA 1000 ppm (2600 mg/m3)	3800 ppm [10%LEL]	Inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact	Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage	Liver, kidneys, respiratory system, cardiovascular system, central nervous system	Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. [Note: Shipped as a liquefied compressed gas.] BP: 54°F Fl.Pt. = NA (gas), -58°F (liquid) LEL: 3.8% UEL: 15.4% Flammable Gas
Chloroform	67-66-3	TWA 10 ppm	Ca ST 2 ppm (9.78 mg/m3) [60-minute]	C 50 ppm (240 mg/m3)	Ca [500 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Liver, kidneys, heart, eyes, skin, central nervous system	Colorless liquid with a pleasant odor BP: 143°F Fl.Pt. = -82°F LEL: NA UEL: NA Noncombustible Liquid
Chloromethane	74-87-3	TWA 50 ppm STEL 100 ppm	Ca	TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3 hours)	Ca [2000 ppm]	Inhalation, skin and/or eye contact (liquid)	Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; liquid: frostbite; reproductive, teratogenic effects; [potential occupational carcinogen]	Central nervous system, liver, kidneys, reproductive system	Colorless gas with a faint, sweet odor which is not noticeable at dangerous concentrations. [Note: Shipped as a liquefied compressed gas.] BP: -12°F Fl.Pt. = NA (Gas) LEL: 8.1% UEL: 17.4% Flammable Gas

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
cis-1,2-Dichloroethene	156-59-2	TWA 200 ppm (All isomers)	TWA 200 ppm (790 mg/m3)	TWA 200 ppm (790 mg/m3)	1000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor. BP: 118-140°F Fl.Pt. = 36-39°F LEL: 5.6% UEL: 12.8% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F
cis-1,3-Dichloropropene	10061-01-5	https://cameochemicals.noaa.gov/chemical/20168				Inhalation, ingestion, skin and/or eye contact	Symptoms of exposure to this compound may include local irritation of the eyes skin and respiratory tract; dermatitis, gasping, coughing, substernal pain, extreme respiratory distress, lacrimation, central nervous system depression, skin irritation, acute gastrointestinal distress with pulmonary congestion and edema. It also may cause injury to the liver, kidneys and heart.	Skin, eyes, mucous membranes, liver, kidney, heart	Colorless to amber liquid with a sweetish odor. BP: 219.7°F Fl.Pt. = NA LEL: NA UEL: NA
Cyclohexane	110-82-7	TWA 100 ppm	TWA 300 ppm (1050 mg/m3)	TWA 300 ppm (1050 mg/m3)	1300 ppm [10%LEL]	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sweet, chloroform-like odor. [Note: A solid below 44°F.] BP: 177°F Fl.Pt. = 0°F LEL: 1.3% UEL: 8.0% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
Dibromochloromethane	124-48-1	https://cameochemicals.noaa.gov/chemical/16183				Inhalation, ingestion, skin and/or eye contact	Symptoms of exposure to this compound may include irritation of the skin, eyes, mucous membranes and upper respiratory tract. It may also cause fatigue. Other symptoms may include central nervous system effects, lung and cornea irritation and liver and kidney damage. Prolonged exposure can cause nausea, dizziness, headache and narcosis.	Skin, eyes, mucous membranes, upper respiratory tract	Clear colorless to yellow-orange liquid BP: 246-248°F Fl.Pt. = Greater than 200°F LEL: NA UEL: NA
Dichlorodifluoromethane	75-71-8	TWA 1000 ppm	TWA 1000 ppm (4950 mg/m3)	TWA 1000 ppm (4950 mg/m3)	15,000 ppm	Inhalation, skin and/or eye contact (liquid)	Dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Cardiovascular system, peripheral nervous system	Colorless gas with an ether-like odor at extremely high concentrations. [Note: Shipped as a liquefied compressed gas.] BP: -22°F Fl.Pt. = NA LEL: NA UEL: NA Nonflammable Gas
Ethylbenzene	100-41-4	TWA 20 ppm	TWA 100 ppm (435 mg/m^3) ST 125 ppm (545 mg/m^3)	TWA 100 ppm (435 mg/m^3)	800 ppm [10%LEL]	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with an aromatic odor. BP: 277°F Fl.Pt. = 55°F LEL: 0.8% UEL: 6.7% Class IB Flammable Liquid below 73°F and BP at or above 100°F
Isopropylbenzene	98-82-8	TWA 1 ppm	TWA 50 ppm (245 mg/m3) [skin]	TWA 50 ppm (245 mg/m3) [skin]	900 ppm [10%LEL]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sharp, penetrating, aromatic odor BP: 306°F Fl.Pt. = 96°F LEL: 0.9% UEL: 6.5% Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F
m&p-Xylenes	179601-23-1								
Methyl Acetate	79-20-9	TWA 200 ppm STEL 250 ppm	TWA 200 ppm (610 mg/m3) ST 250 ppm (760 mg/m3)	TWA 200 ppm (610 mg/m3)	3100 ppm [10%LEL]	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; In Animals: narcosis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, fruity odor BP: 135°F Fl.Pt. = 14°F LEL: 3.1% UEL: 16% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Methylcyclohexane	108-87-2	TWA 400 ppm	TWA 400 ppm (1600 mg/m3)	TWA 500 ppm (2000 mg/m3)	1200 ppm [LEL]	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, drowsiness; In Animals: narcosis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a faint, benzene-like odor BP: 214°F Fl.Pt. = 25°F LEL: 1.2% UEL: 6.7% Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
Methylene chloride	75-09-2	TWA 50 ppm	Ca	[1910.1052] TWA 25 ppm ST 125 ppm	Ca [2300 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eyes, skin, cardiovascular system, central nervous system	Colorless liquid with a chloroform-like odor. [Note: A gas above 104°F.] BP: 104°F Fl.Pt. = NA LEL: 13% UEL: 23% Combustible Liquid
Methyl-t-butyl ether	1634-04-4	TWA 50 ppm				Inhalation, skin absorption, ingestion, skin and/or eye contact	May cause dizziness or suffocation. Contact may irritate or burn eyes or skin. May be harmful if swallowed.	Eyes, skin	A colorless liquid with a distinctive anesthetic-like odor. BP: 131°F Fl.Pt. = -14°F LEL: NA UEL: NA
o-Xylene	95-47-6	TWA 100 ppm STEL 150 ppm (All isomers)	TWA 100 ppm (435 mg/m3) ST 150 ppm (655 mg/m3)	TWA 100 ppm (435 mg/m3)	900 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Colorless liquid with an aromatic odor BP: 292°F Fl.Pt. = 90°F LEL: 0.9% UEL: 6.7% Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F
Styrene	100-42-5	TWA (20 ppm) STEL (40 ppm)	TWA 50 ppm (215 mg/m3) ST 100 ppm (425 mg/m3)	TWA 100 ppm C 200 ppm 600 ppm (5-minute maximum peak in any 3 hours)	700 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; possible liver injury; reproductive effects	Eyes, skin, respiratory system, central nervous system, liver, reproductive system	Colorless to yellow, oily liquid with a sweet, floral odor BP: 293°F Fl.Pt. = 88°F LEL: 0.9% UEL: 6.8% Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F
Tetrachloroethene	127-18-4	TWA 25 ppm STEL 100 ppm	Ca Minimize workplace exposure concentrations	TWA 100 ppm C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm	Ca [150 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Colorless liquid with a mild, chloroform-like odor BP: 250°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene
Sodium Hydroxide	1310-73-2	STEL C 2 mg/m^3	C 2 mg/m^3	TWA 2 mg/m^3	10 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; pneumonitis; eye, skin burns; temporary loss of hair	Eyes, skin, respiratory system	Colorless to white, odorless solid (flakes, beads, granular form). BP: 2534°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid, but when in contact with water may generate sufficient heat to ignite combustible materials.
Sulfuric Acid	7664-93-9	TWA 0.2 mg/m^3	TWA 1 mg/m^3	TWA 1 mg/m^3	15 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis	Eyes, skin, respiratory system, teeth	Colorless to dark-brown, oily, odorless liquid.[Note: Pure compound is a solid below 51°F. Often used in an aqueous solution.] BP = 554°F Fl.Pt. = NA LEL = NA UEL = NA Noncombustible Liquid, but capable of igniting finely divided combustible materials.

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
trans-1,2-Dichloroethene	156-60-5	200 ppm (All isomers)	TWA 200 ppm (790 mg/m3)	TWA 200 ppm (790 mg/m3)	1000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor. BP: 118-140°F Fl.P: 36-39°F LEL: 5.6% UEL: 12.8% Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F.
trans-1,3-Dichloropropene	10061-02-6	https://cameochemicals.noaa.gov/chemical/18110				Inhalation, ingestion, skin and/or eye contact	Symptoms of exposure to this compound may include local irritation of the eyes skin and respiratory tract, dermatitis, gasping, coughing, substernal pain, extreme respiratory distress, lacrimation, central nervous system depression, acute gastrointestinal distress with pulmonary congestion and edema. It may also cause injury to the liver, kidneys and heart	Skin, eyes, mucous membranes, liver, kidney, heart	A clear colorless liquid with chloroform odor BP: 234°F Fl.P: NA LEL: NA UEL: NA
Toluene	108-88-3	TWA 20 ppm	TWA 100 ppm (375 mg/m^3) ST 150 ppm (560 mg/m^3)	TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)	500 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, pungent, benzene-like odor. BP: 232°F Fl.P: 40°F LEL: 1.1% UEL: 7.1% Class IB Flammable Liquid Fl.P. below 73°F and BP at or above 100°F.
Trichloroethene (TCE)	79-01-6	TWA 10 ppm STEL 25 ppm	Ca	TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)	Ca [1000 ppm]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid (unless dyed blue) with a chloroform-like odor. BP: 189°F Fl.Pt. = NA LEL(77°F): 8.0% UEL(77°F): 10.5% Combustible Liquid, but burns with difficulty.
Trichlorofluoromethane	75-69-4	STEL C 1000 ppm	C 1000 ppm (5600 mg/m3)	TWA 1000 ppm (5600 mg/m3)	2000 ppm	Inhalation, ingestion, skin and/or eye contact	Incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Skin, respiratory system, cardiovascular system	Colorless to water-white, nearly odorless liquid or gas (above 75°F) BP: 75°F Fl.P: NA LEL: NA UEL: NA Noncombustible Liquid Nonflammable Gas
Vinyl Chloride (chloroethylene)	75-01-4	TWA 1 ppm	Ca	TWA 1 ppm C 5 ppm [15-minute]	Ca (ND)	Inhalation, skin and/or eye contact (liquid)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Liver, central nervous system, blood, respiratory system, lymphatic system	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.[Note: Shipped as a liquefied compressed gas.] BP: 7°F Fl.Pt. = NA (Gas) LEL: 3.6% UEL: 33.0% Flammable Gas
Xylene (m, o & p isomers)	108-38-3, 95-47-6, 106-42-3	TWA 100 ppm STEL 150 ppm	TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3)	TWA 100 ppm (435 mg/m^3)	900 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Colorless liquid with an aromatic odor BP: 282°F, 292°F, 281°F Fl. Pt. 82°F, 90°F, 81°F LEL: 1.1%, 0.9%, 1.1% UEL: 7.0%, 6.7%, 7.0% Class IC Flammable Liquid at or above 73°F and below 100°F.
Zinc Oxide (dust)	7440-66-6	TWA 2 mg/m3 STEL 10 mg/m^3	TWA 5 mg/m^3 C 15 mg/m^3	TWA 15 mg/m^3 (total dust) TWA 5 mg/m^3 (resp dust)	500 mg/m^3	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	White, odorless solid. BP: NA Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)									
2-Chloronaphthalene	91-58-7	https://cameochemicals.noaa.gov/chemical/16185				Inhalation, ingestion, skin and/or eye contact	Chloracne, cysts, headache, fatigue, vertigo, anorexia and jaundice		Monoclinic plates or off-white crystalline powder BP: NA Fl.Pt. = NA LEL: NA UEL: NA

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
2-Methylnapthalene	91-57-6	TWA 0.5 ppm	https://cameochemicals.noaa.gov/chemical/20668			Inhalation, ingestion, skin and/or eye contact	Headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Skin, eyes, mucous membranes and upper respiratory tract	White crystalline solid Combustible solid BP: 466-468 ° F Fl.Pt. = 208 ° F LEL: NA UEL: NA
Acenaphthene	83-32-9	https://cameochemicals.noaa.gov/chemical/10358				Inhalation, ingestion, skin and/or eye contact	Irritation of the skin, eyes, mucous membranes and upper respiratory tract, vomiting	Skin, eyes, mucous membranes and upper respiratory tract	White needles BP: 534 ° F Fl.Pt. = NA LEL: 0.6% UEL: NA
Acenaphthylene	208-96-8	https://cameochemicals.noaa.gov/chemical/16157				Inhalation, ingestion, skin and/or eye contact			Colorless crystalline solid BP: 509 to 527 ° F at 760 mm Hg Fl.Pt. = NA LEL: NA UEL: NA
Anthracene	120-12-7	None listed	Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002]	Ca [80 mg/m3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue BP: NA Fl.Pt. = NA LEL: NA UEL: NA Combustible Solids
Benzo[a]anthracene	56-55-3	https://cameochemicals.noaa.gov/chemical/16171				Inhalation, injestion, skin and/or eye contact			Colorless leaflets or plates or coarse gold powder with a greenish-yellow fluorescence. May reasonably be expected to be a carcinogen. BP: 815° F at 760 mm Hg Fl.Pt. = NA LEL: NA UEL: NA
Benzo[a]pyrene	50-32-8	None listed	Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002]	Ca [80 mg/m3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue BP: NA Fl.Pt. = NA LEL: NA UEL: NA Combustible Solids
Benzo[b]fluoranthene	205-99-2	None listed	https://cameochemicals.noaa.gov/chemical/16172			Inhalation, injestion, skin and/or eye contact			Needles or yellow fluffy powder BP: NA Fl.Pt. = NA LEL: NA UEL: NA
Benzo[g,h,i]perylene	191-24-2	https://cameochemicals.noaa.gov/chemical/16174				Inhalation, injestion, skin and/or eye contact	Inhalation of material may be harmful. Contact may cause burns to skin and eyes. Inhalation of Asbestos dust may have a damaging effect on the lungs. Fire may produce irritating, corrosive and/or toxic gases. Some liquids produce vapors that may cause dizziness or suffocation. Runoff from fire control may cause pollution.	Lungs, skin, eyes	Colorless to white crystalline solid. Water insoluble. BP: NA Fl.Pt. = NA LEL: NA UEL: NA
Benzo[k]fluoranthene	207-08-9	https://cameochemicals.noaa.gov/chemical/16173				Inhalation, injestion, skin and/or eye contact	When heated to decomposition this compound emits acrid smoke and irritating fumes.		Pale yellow needles or yellow crystalline solid BP: 896° F Fl.Pt. = NA LEL: NA UEL: NA
Chrysene	218-01-9	None listed	Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002]	Ca [80 mg/m3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue BP: NA Fl.Pt. = NA LEL: NA UEL: NA Combustible Solids
Dibenzo(a,h)anthracene	53-70-3	https://cameochemicals.noaa.gov/chemical/16192				Inhalation, injestion, skin and/or eye contact	Symptoms of exposure to this compound may include irritation. This compound is harmful if swallowed or inhaled. It may cause irritation. When heated to decomposition it emits acrid smoke, irritating fumes and toxic fumes of carbon monoxide and carbon dioxide.	Lungs	White crystals or pale yellow solid. Sublimes BP: 975° F Fl.Pt. = NA LEL: NA UEL: NA

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Fluoranthene	206-44-0	https://cameochemicals.noaa.gov/chemical/16213				Inhalation, injestion, skin and/or eye contact	When heated to decomposition this compound emits acrid smoke and fumes.		Light yellow fine crystals BP: 482° F Fl.Pt. = NA LEL: NA UEL: NA
Fluorene	86-73-7	https://cameochemicals.noaa.gov/chemical/16214				Inhalation, injestion, skin and/or eye contact			White leaflets. Sublimes easily under a vacuum. Fluorescent when impure. BP: 563° F Fl.Pt. = NA LEL: NA UEL: NA
Indeno[1,2,3-cd]pyrene	193-39-5	https://cameochemicals.noaa.gov/chemical/16218				Inhalation, injestion, skin and/or eye contact			Yellow crystals BP: 997° F Fl.Pt. = NA LEL: NA UEL: NA
Naphthalene	91-20-3	TWA 10 ppm	TWA 10 ppm (50 mg/m3) ST 15 ppm (75 mg/m3)	TWA 10 ppm (50 mg/m3)	250 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	Colorless to brown solid with an odor of mothballs. [Note: Shipped as a molten solid.] BP: 424°F Fl.P: 174°F LEL: 0.9% UEL: 5.9% Combustible Solid, but will take some effort to ignite
Phenanthrene	85-01-8	https://cameochemicals.noaa.gov/chemical/16236				Inhalation, injestion, skin and/or eye contact	Symptoms following exposure to this compound may include skin sensitization, dermatitis, bronchitis, cough, dyspnea, respiratory neoplasm, kidney neoplasm, skin irritation, and respiratory irritation.	Skin, respiratory tract	Colorless monoclinic crystals with a faint aromatic odor. Solutions exhibit a blue fluorescence. BP: 642° F Fl.Pt. = 340° F LEL: NA UEL: NA
Pyrene	129-00-0	None listed	Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002]	Ca [80 mg/m3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue BP: NA Fl.Pt. = NA LEL: NA UEL: NA Combustible Solids
METALS									
Aluminum	7429-90-5	TWA 1 mg/m3	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)	TWA 15 mg/m^3 (total) TWA 5 mg/m^3 (resp)	N.D.	Inhalation, skin and/or eye contact	Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system	Silvery-white, malleable, ductile, odorless metal BP: 4221°F Fl.Pt. = NA LEL: NA UEL: NA Combustible Solid, finely divided dust is easily ignited; may cause explosions.
Antimony	7440-36-0	TWA 0.5 mg/m3	TWA 0.5 mg/m3 [*Note: The REL also applies to other antimony compounds (as Sb).]	TWA 0.5 mg/m3 [*Note: The PEL also applies to other antimony compounds (as Sb).]	50 mg/m3 (as Sb)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, cardiovascular system	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder BP: 2975°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame.
Arsenic	7440-38-2	TWA 0.01 mg/m3	Ca C 0.002 mg/m3 [15-minute]	[1910.1018] TWA 0.010 mg/m3	Ca [5 mg/m3 (as As)]	Inhalation, skin absorption, skin and/or eye contact, ingestion	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic system	Metal: Silver-gray or tin-white, brittle, odorless solid BP: Sublimes Fl.Pt. = NA LEL: NA UEL: NA Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Barium	7440-39-3	TWA 0.5 mg/m3	0.5 mg Ba/m3 TWA	0.5 mg Ba/m3 TWA	50 mg Ba/m3	Inhalation, ingestion, skin and/or eye contact	Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. Contact may cause burns to skin, eyes, and mucous membranes. May be toxic by ingestion, inhalation and skin absorption. Used to make other chemicals.	Lungs, skin, eyes, and mucous membrane	A silver to white metallic solid BP: 1337°F Fl.Pt. = NA LEL: NA UEL: NA
Beryllium	7440-41-7	TWA 0.00005 mg/m^3	Ca C 0.0005 mg/m^3	STEL 0.002 mg/m^3 TWA 0.0002 mg/m^3	Ca [4 mg/m^3 (as Be)]	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	Hard, brittle, gray-white solid BP: 4532°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid in bulk form, but a slight explosion hazard in the form of a powder or dust.
Cadmium	7440-43-9	TWA 0.01 mg/m^3 TWA 0.002 mg/m^3 (as Cd)	Ca	TWA 0.005 mg/m^3	Ca [9 mg/m3 (as Cd)]	Inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Respiratory system, kidneys, prostate, blood	Silver-white/blue tinged lustrous, odorless solid. BP: 1409°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible - will burn in powder form
Calcium	7440-70-2	https://cameochemicals.noaa.gov/chemical/309				Inhalation, ingestion, skin and/or eye contact	Contact with eyes or skin produces caustic burns.	Eyes, skin	A silvery, soft metal that turns grayish white on exposure to air. BP: 2714°F Fl.Pt. = NA LEL: NA UEL: NA
Chromium	7440-47-3	TWA 0.5 mg/m^3 (metal) TWA 0.003 mg/m^3 (water-soluble Cr III compounds) TWA 0.0002 mg/m^3 (water-soluble Cr VI compounds)	TWA 0.5 mg/m^3	TWA 1 mg/m^3	250 mg/m^3 (as Cr)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; lung fibrosis (histologic)	Eyes, skin, respiratory system	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid. BP: 4788°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible - will burn in dust form if heated in a flame
Cobalt	7440-48-4	TWA 0.02 mg/m3	TWA 0.05 mg/m3	TWA 0.1 mg/m3	20 mg/m3 (as Co)	Inhalation, ingestion, skin and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Skin, respiratory system	Odorless, silver-gray to black solid BP: 5612°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid in bulk form, but finely divided dust will burn at high temperatures.
Copper	7440-50-8	TWA 0.2 mg/m^3 (fume) TWA 1 mg/m3 (dusts and mists)	TWA 1 mg/m^3	TWA 1 mg/m^3	100 mg/m^3 (as Cu)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia	Eyes, skin, respiratory system, liver, kidneys (increased risk with Wilson's disease)	Reddish, lustrous, malleable, odorless solid. BP: 4703°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible - powdered form may ignite
Iron	7439-89-6	TWA 1 mg/m3	TWA 1 mg/m^3	NA	NA	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting; possible liver damage	Eyes, skin, respiratory system, liver, gastrointestinal tract	Appearance and odor vary depending upon the specific soluble iron salt. BP: NA Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solids
Lead	7439-92-1	TWA 0.05 mg/m3	TWA (8-hour) 0.050 mg/m3	[1910.1025] TWA 0.050 mg/m3	100 mg/m3 (as Pb)	Inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid BP: 3164°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid in bulk form

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Magnesium	7439-95-4	https://cameochemicals.noaa.gov/chemical/6949				Eye and/or skin contact	Dust irritates eyes in same way as any foreign material. Penetration of skin by fragments of metal is likely to produce local irritation, blisters, and ulcers which may become infected.	Eyes	A light silvery metal BP: 1202°F Fl.Pt. = NA LEL: NA UEL: NA
Manganese	7439-96-5	TWA 0.02 mg/m3 [R] TWA 0.1 mg/m3 [I]	TWA 1 mg/m3 ST 3 mg/m3	C 5 mg/m3	500 mg/m3 (as Mn)	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 discomfort); lassitude (weakness, exhaustion); kidney damage	respiratory system, central nervous system, blood, kidneys	A lustrous, brittle, silvery solid BP: 3564°F Fl.Pt. = NA LEL: NA UEL: NA Metal: Combustible Solid
Mercury	7439-97-6	TWA 0.01 mg/m3 STEL 0.03 mg/m3	Hg Vapor: TWA 0.05 mg/m3 [skin] Other: C 0.1 mg/m3 [skin]	TWA 0.1 mg/m3	10 mg/m3 (as Hg)	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.] BP: 674°F Fl.Pt. = NA LEL: NA UEL: NA Metal: Noncombustible Liquid
Nickel	7440-02-0	TWA 1.5 mg/m^3 [elemental] TWA 0.1 mg/m^3 [soluble inorganic compound] TWA 0.2 mg/m^3 [insoluble inorganic compound] TWA 0.1 mg/m^3 [Nickel subsulfide]	Ca TWA 0.015 mg/m^3	TWA 1 mg/m^3	Ca [10 mg/m3 (as Ni)]	Inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin	Lustrous, silvery, odorless solid. BP: 5139°F Fl.Pt. = NA LEL: NA UEL: NA Combustible Solid; nickel sponge catalyst may ignite spontaneously in air.
Potassium	9/7/7440	https://cameochemicals.noaa.gov/chemical/4289				Eye and/or skin contact	Will burn skin and eyes	Skin, eyes	Potassium is a soft silvery metal though normally grayish white due to oxidation BP: 1425°F Fl.Pt. = NA LEL: NA UEL: NA
Selenium	7782-49-2	TWA 0.2 mg/m3	TWA 0.2 mg/m3	TWA 0.2 mg/m3	1 mg/m3 (as Se)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; In Animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eyes, skin, respiratory system, liver, kidneys, blood, spleen	Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.] BP: 1265°F Fl.Pt. = NA LEL: NA UEL: NA Combustible Solid
Silver	7440-22-4	TWA 0.1 mg/m3 [Metal, dust, and fume] TWA 0.01 mg/m3 [Soluble compounds, as Ag]	TWA 0.01 mg/m3	TWA 0.01 mg/m3	10 mg/m3 (as Ag)	Inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Nasal septum, skin, eyes	Metal: White, lustrous solid BP: 3632°F Fl.Pt. = NA LEL: NA UEL: NA Metal: Noncombustible Solid, but flammable in form of dust or powder
Sodium	7440-23-5	https://cameochemicals.noaa.gov/chemical/7794				Skin contact	Severe burns caused by burning metal or by caustic soda formed by reaction with moisture on skin	Skin	A silvery soft metal that becomes grayish white upon exposure to air BP: 1621°F Fl.Pt. = NA LEL: NA UEL: NA
Thallium	7440-28-0	0.02 mg/m3 [I]	TWA 0.1 mg/m3 [skin]	TWA 0.1 mg/m3 [skin]	15 mg/m3 (as Tl)	Inhalation, skin absorption, ingestion, skin and/or eye contact	Nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eyes, respiratory system, central nervous system, liver, kidneys, gastrointestinal tract, body hair	Appearance and odor vary depending upon the specific soluble thallium compound BP: NA Fl.Pt. = NA LEL: NA UEL: NA
Vanadium	7440-62-2	https://cameochemicals.noaa.gov/chemical/16147				Inhalation, skin absorption, ingestion, skin and/or eye contact	Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin. Avoid any skin contact. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution	Skin	Silvery-whitish powder BP: NA Fl.Pt. = NA LEL: NA UEL: NA

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Zinc	7440-66-6	https://cameochemicals.noaa.gov/chemical/4814				Inhalation, skin absorption, ingestion, skin and/or eye contact	Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. May produce corrosive solutions on contact with water. Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control may cause pollution	Lungs	A grayish powder BP: NA Fl.Pt. = NA LEL: NA UEL: NA
PCBs									
PCBs (total)	11097-69-1, 53469-21-9	TWA 0.5 mg/m3 TWA 1 mg/m3	Ca TWA 0.001 mg/m3 Ca TWA 0.001 mg/m3	TWA 0.5 mg/m3 [skin] TWA 1 mg/m3 [skin]	Ca [5 mg/m3] Ca [5 mg/m3]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]	Skin, eyes, liver, reproductive system	Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor BP: 689-734°F, 617-691°F Fl.Pt. = NA, NA LEL: NA UEL: NA Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.
Petroleum Hydrocarbons									
Gasoline	86290-81-5	TWA 300 ppm STEL 500 ppm	Ca	None	Ca [N.D.]	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Clear liquid with a characteristic odor BP: 102°F Fl.Pt. = -45°F LEL: 1.4% UEL: 7.6%

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Abbreviations:

ACGIH – American Conference of Governmental Industrial Hygienists.
BP – boiling point at 1 atmosphere, °F
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.
Ca – Carcinogenic.
CAS# - Chemical Abstracts Service registry number which is unique for each chemical.
Ft Pt. – Flash point
IDLH - Immediately Dangerous to Life and Health concentrations represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)
mg/m^3 – Milligrams of substance per cubic meter of air
NIOSH - National Institute for Occupational Safety and Health.
OSHA – Occupational Safety and Health Administration
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.
ppm – parts per million
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week
SG - Specific Gravity
STEL – ACGIH Short-term exposure limit (ST)
TLV - ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).
TWA – 8-hour, time-weighted average
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)
VP - Vapor Pressure

FIGURES

1. Site Location Map
2. Hospital Route Map
3. Urgent Care Route Map

QUADRANGLE LOCATION

SOURCE:
USGS; 2016, Central Park, NY
USGS; 2013, Brooklyn, NY
7.5 Minute Topographic Quadrangle

N

0 2000'

Title:

SITE LOCATION MAP

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

THE VOREA GROUP, LLC

ROUX

Compiled by: W.S.	Date: 10JUL20	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	1
Project Mgr.: W.S.	Project No.: 2887.0004Y000	
File: 2887.0004Y101.01.CDR		

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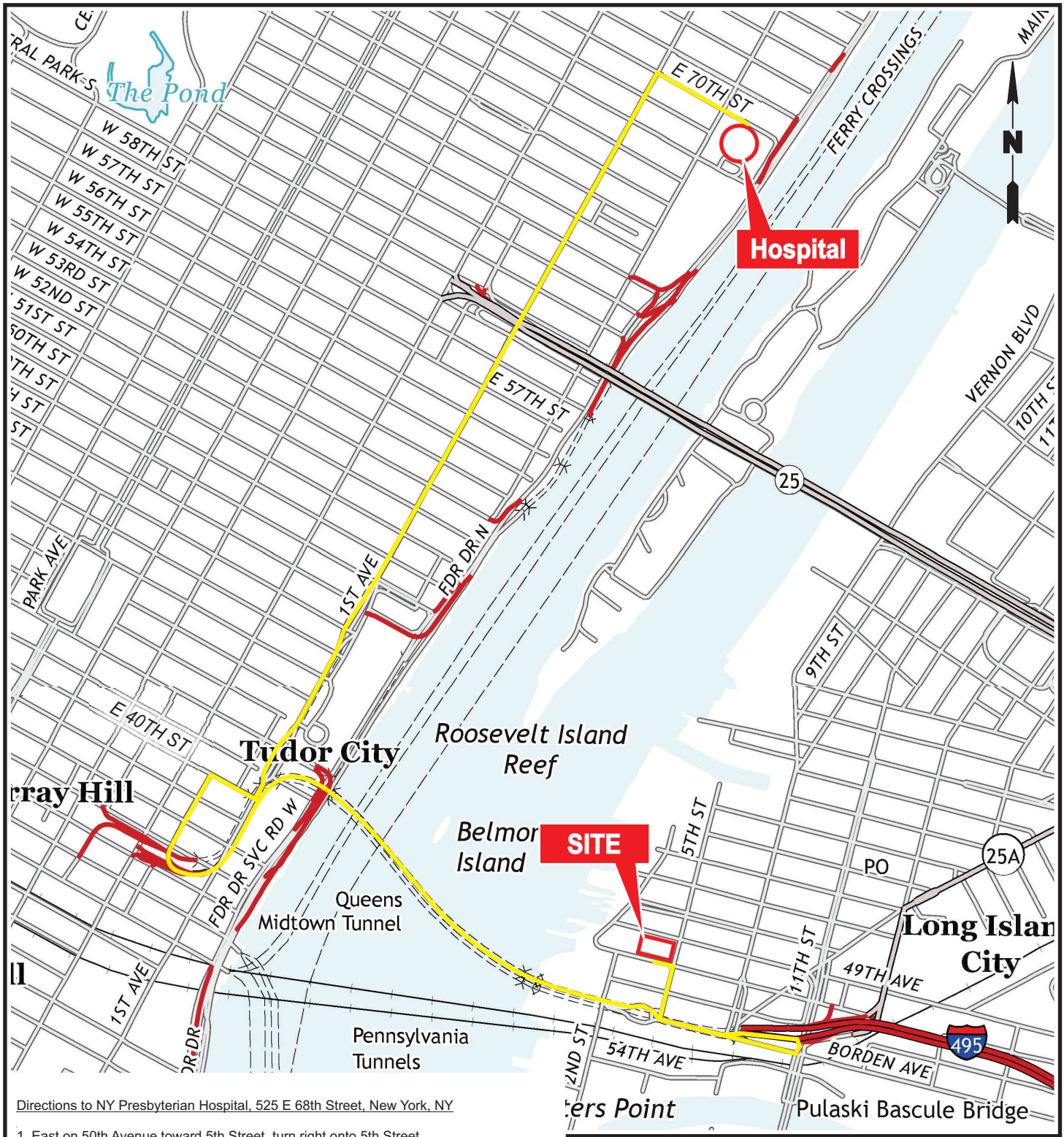

Directions to NY Presbyterian Hospital, 525 E 68th Street, New York, NY

1. East on 50th Avenue toward 5th Street, turn right onto 5th Street.
2. Turn left onto Borden Avenue.
3. Turn left onto Interstate 495, Long Island Expressway. Take ramp to I-495 west.
4. Continue on I-495 West through Queens/Midtown Tunnel.
5. Use right lane to Downtown exit. Keep right at fork, follow signs to 39th St W.
6. Turn right onto E 40th Street.
7. Turn left onto 1st Avenue/United Nations Plaza. Use two left lanes to stay on 1st Avenue.
8. Merge onto 1st Avenue.
9. Continue on 1st Avenue to 70th Street.
10. Turn right onto 70th Street to hospital.

0 1500'

Title:

HOSPITAL ROUTE MAP

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

THE VOREA GROUP, LLC

ROUX

Compiled by: W.S.	Date: 10JUL20	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	2
Project Mgr.: W.S.	Project No.: 2887.0004Y000	
File: 2887.0004Y101.01.CDR		

N:\PROJECTS\2887Y\0004Y\101\2887.0004Y101.01.CDR

Directions to Urgent Care, 10-11 49th Street, Long Island City, NY

1. East on 50th Avenue toward 5th Street, turn right onto 5th Street.
2. Turn left onto Borden Avenue.
3. Turn Left onto Vernon Boulevard.
4. Turn right onto 49th Avenue. Urgent care on the left.

N

0 1000'

Title:

URGENT CARE ROUTE MAP

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

THE VOREA GROUP, LLC

ROUX

Compiled by: W.S.	Date: 10JUL20	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	3
Project Mgr.: W.S.	Project No.: 2887.0004Y000	
File: 2887.0004Y101.01.CDR		

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APPENDICES

A. Job Safety Analysis (JSA) Forms
B. SDSs for Chemicals Used
C. Incident Investigation and Reporting Program
D. Heavy Equipment Exclusion Zone Policy
E. Subsurface Utility Clearance Management Program
F. Personal Protective Equipment (PPE) Management Program
G. COVID-19 Interim Health and Safety Guidance
H. Community Air Monitoring Plan

APPENDIX A

Job Safety Analysis (JSA) Forms

JOB SAFETY ANALYSIS	Ctrl. No. GEN-006	DATE 01/06/2022	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
Generic	**Drilling**	**Direct Push Soil Borings / Well Installation**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Timothy Zei	Project Hydrogeologist	Raymond Olson	OHSM
		Brian Hobbs	CHSD
		Ray Greenidge	Sr. Compliance Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION: (as needed) ☒ SAFETY SHOES: Composite-toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing, Long Sleeve Shirt	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Insect Repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Geoprobe or Truck-Mounted Direct Push Drill Rig, Hand Tools, Photoionization Detector, Multi-Gas Meter (or equivalent), Macrocore liners, Liner Opening Tool, 20 lb. Type ABC Fire Extinguisher, 42" Cones & Flags, "Work Area" Signs, Water

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

"SHOW ME YOUR HANDS"
Driller and helper should show that hands are clear from controls and moving parts

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilization of drilling rig (ensure the Subsurface Clearance Protocol and Drill Rig Checklist are completed)	**1a. CONTACT:** Equipment/property damage.	1a. The drill rig's tower/derrick will be lowered and secured prior to mobilization. 1a. A spotter should be utilized while moving the drill rig. If personnel move into the path of the drill rig, the drill rig will be stopped until the path is again clear. Use a spotter for all required backing operations. 1a. Set-up the work area and position equipment in a manner that eliminates or reduces the need for backing of support trucks and trailers. 1a. When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver visibility. 1a. Inspect the driving path for uneven terrain. Level or avoid if needed. 1a. Drill rig should have a minimum **exclusion zone which encompasses its tip radius** for non-essential personnel (i.e., driller helper, geologist) when the rig is moving/ in operation.
	1b. FALL: Slip/trip/fall hazards.	1b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 1b. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 1b. Use established pathways and walk on stable, secure ground.
	1c. CONTACT: Crushing from roll-over.	1c Geoprobe should cross all hills/obstructions head on with the mast down to reduce risk of roll-over.
2. Raising tower/derrick of drill rig	**2a. CONTACT:** Overhead hazards.	2a. Prior to raising the tower/derrick, the area above the drilling rig will be inspected for wires, tree limbs, piping, or other structures, that could come in contact with the rig's tower and/or drilling rods or tools. 2a. Maintain a safe distance of 10' from overhead structures.
	2b. CONTACT: Pinch Points/Amputation Points when raising the rig and instability of rig	2b. Inspect the equipment prior to use and avoid pinch/amputation points. 2b. Lower outriggers to ensure stability prior to raising rig tower/derrick. 2b. If the rig needs to be mounted, be sure to use three points of contact.
3. Advancement of drilling equipment and well installation	**3a. CONTACT:** Flying debris	3a. Be aware of and avoid potential line-of-fire hazards and wear required PPE such as eye, ear, and hand protection.
	3b. EXPOSURE: Noise and dust.	3b. Wet borehole area with sprayer to minimize dust. 3b. Stand upwind and keep body away from rig. 3b. Dust mask should be worn if conditions warrant. 3b. Wear hearing protection when the drill rig is in operation.
Assess [1]JOB STEPS	**Analyze [2]POTENTIAL HAZARDS**	**Act [3]CRITICAL ACTIONS**

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

3. Advancement of drilling equipment and well installation (Continued)	**3a. CONTACT:** Flying debris **3b. EXPOSURE:** Noise and dust. **3c. FALL:** Slip/trip/fall hazards. **3d. CAUGHT:** Limb/extremity pinching; abrasion/crushing. **3e. CONTACT:** Equipment imbalance during advancement of drill equipment. **3f. EXPOSURE:** Inhalation of contamination/vapors. **3g. EXERTION:** Potential for muscle strain/injury while lifting and installing well casings, lifting sand bags, and/or lifting rods.	3c. Contain drill cuttings and drilling water to prevent fall hazards from developing in work area. 3c. See 1b. 3d. Ensure all Emergency Safety Stop buttons function properly. 3d. Always wear leather gloves when making connections and using hand tools; wear cut-resistant (i.e., Kevlar) gloves when handling cutting tools. 3d. Inspect the equipment prior to use for potential pinch/amputation points. Keep hands away from pinch/amputation points and use of tools is preferable compared to fingers and hands. 3d. Inspect drill head for worn surface or missing teeth; replace if damaged or blunt. 3d. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. 3d. All non-essential personnel should stay away from the immediate work area; position body out of the line-of-fire of equipment. 3d. Drillers and helpers will understand and use the "Show Me Your Hands" Policy. 3d. Spinning rods/casing have an **exclusion zone of tip radius** while in operation. 3e. Drillers will advance the borehole with caution to avoid causing the rig to become imbalanced and/or tip. 3e. The blocking and leveling devices used to secure the rig will be inspected by drillers and Roux personnel regularly to see if shifting has occurred. 3e. In addition, personnel and equipment that are non-essential to the advancement of the borehole will be positioned away from the rig at a distance that is at least as far as the boom is high (**minimum exclusion zone**). 3f. Monitor ambient air for dangerous conditions using a calibrated photoionization detector (PID) to periodically monitor the breathing zone of the work area. 3f. If a reading of >5ppm is recorded, the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings and inform the Roux PM of the condition. The Roux PM will then recommend additional precautions in accordance with the site specific health and safety plan. 3f. Use a multi-gas meter to monitor ambient air for dangerous conditions (i.e. unsafe levels of carbon monoxide when drilling indoors or the presence of explosive vapors). 3g. Keep back straight and bend at the knees. 3g. Utilize team lifting or mechanical means for objects over 50lbs. 3g. Use mechanical lifting device for odd shaped objects.
4. Remove sample liner.	**4a. EXERTION:** Potential for muscle strain/injury while removing liner from probe rod. **4b. CONTACT:** Pinch points and cuts **4c. EXPOSURE:** Inhalation and/or dermal contact with contaminants.	4a Utilize team lifting or mechanical means for objects over 50lbs. 4a. Use hydraulic liner extruder if available. 4b. Place liner on sturdy surface when opening. 4b. Don cut-resistant gloves and use appropriate liner cutter when opening liners. 4b. Always cut away from the body. 4c. Wear chemical-resistant disposable gloves when handling liners. 4c. See 3f.
5. Decontaminate equipment.	**5a. EXPOSURE/CONTACT**: To contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors). **5b. EXPOSURE:** To chemicals in cleaning solution including ammonia.	5a. Wear chemical-resistant disposable gloves and safety glasses. 5a. Contain decontamination water so that it does not spill. 5a. Use an absorbent pad to clean spills, if necessary. 5a. Spray equipment from side angle, not straight on, to avoid backsplash. 5a. See 3b and 3f. 5b. See 4a. Review SDS to ensure appropriate precautions are taken and understood.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-009	DATE: 01/06/2022	☐ NEW ☒ REVISED	PAGE 1 of 1

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**O&M**	**Movement of 55-Gallon Drums/Drum Handling with Mobile Carrier**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Michael Sarni	Technician	Brian Hobbs	CHSD
		Ray Greenidge	Sr. Compliance Mgr.

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut-resistant gloves
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER:
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent long sleeve shirt or long sleeve shirt and reflective safety vest.	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel or composite toe		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Mobile Drum Carrier, over-pack drum container, safety cones, and caution tape

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment (i.e. forklift) and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Preparing for and Inspection of Drum	**1a. FALL:** Tripping/falling due to uneven surface. Loose debris/garbage in work area.	1a. Clear area of loose garbage and debris. Inspect 55-gal drums for proper condition, labeling, check drum ring and bolts for tightness, inspect mobile drum carrier. 1a. Do a Test Lift to get a general sense of the weight of the drum. 1a. Inspect and use established pathways to avoid uneven terrain, weather-related hazards (i.e., debris, puddles, ice, etc.), and other obstructions. 1a. Secure work area and coordinate and communicate the planned work activities with other personnel working in the area. 1a. Delineate work area with 42" safety cones.
	1b. CONTACT/EXPOSURE: Drums could potentially be damaged or contain hazardous material. Mobile drum carrier could potentially be in poor working condition causing malfunctioning during operation.	1b. Prior to inspecting drums don cut-resistant gloves. If drum is not properly labeled, do not open and cease all drum transport activities. Immediately contact project manager and inform him/her of drum situation. 1b. Do not continue drum transport activities until further actions are determined by the project manager. 1b. If the drum is properly labeled, but leaking, improperly sealed or in poor condition, place drum in an over-pack drum. 1b. Inspect mobile drum carrier to ensure its overall integrity. Look for rust marks or potential weak points where the drum carrier could malfunction. Inspect the wheels to ensure that they easily turn and nothing is impeding their movement.
	1c. EXERTION/CAUGHT: Potential pinching/exertion hazards while securing ring/ tightening bolts	1c. Keep back straight and knees slightly bent while securing drum ring/tightening bolt. Wear cut-resistant gloves.
2. Position drum clamp tightly in between drum ribs, securing drum clamp to drum with chain	**2a. CAUGHT:** Pinching fingers between drum clamp and handle/chain.	2a. Attach drum clamp with chain and tighten until snug. Do not place hands between drum clamp and drum as the chain is tightened; wear cut resistant gloves. Keep face away from drum when handling in case of escaping vapors.

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[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Disengage safety latches on handle, pull handle down until drum is lifted off ground and safety latches are reengaged; slightly suspending drum off the ground	**3a. EXERTION/ CONTACT:** Potential muscle strain associated with lifting/engaging drum/handle. Drum could shift/slip downward and crush toes.	3a. Ascertain whether the drum is overweight; if it is, then two people are needed to lower handle while drum is secured with clamp so that safety latches can be engaged. Keep body out of the lin-of-fire of the handle (do not position head above handle) as it is being pushed down. Do not allow feet/toes to be positioned under the drum as it is being lifted; wear steel/composite-toed boots.
	3b. CAUGHT: Fingers could be pinched while engaging/disengaging safety latches on handle	3b. Wear cut-resistant gloves while disengaging/reengaging safety latches. 3b. Avoid placing hands in pinch points.
4. Transport drums to designated location and disengage drum clamp (repeat Step 3 in reverse order)	**4a. FALL:** Tripping/ falling due to obstructions and uneven terrain. Potential for drum to fall during transport.	4a. Ensure transport path is free of potential obstructions that may cause the drum/carrier to become unstable. Position drum clamp between the ribs on the drum to prevent possible slipping.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.

[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy source – electricity, pressure, compression/tension.

[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

JOB SAFETY ANALYSIS	Ctrl. No. GEN-011	DATE: 01/06/2022	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**Construction - Excavation**	**Excavation / Trenching**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
David Kaiser	Senior Engineer	Brian Hobbs	CHSD
Tim Unalp	SHSO	Ray Greenidge	Sr. Compliance Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather or cut resistant
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☒ LONG SLEEVED SHIRT	☒ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility long sleeved clothing	
☐ LIFELINE / BODY HARNESS	☒ SAFETY SHOES: Steel-toe boots		
☒ SAFETY GLASSES			

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Jackhammer, Excavator, Backhoe, Hand Tools, Photoionization Detector, barrels, 42" traffic cones, snow fencing, telescoping poles, temporary chain link fence, ladders, shovels, digging bars, power tools (cut-off saw), Two-way radios, Sheeting, Trench box, Retractable lanyard, Harness

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or footprint of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Pre-Clearance Protocol.	**1a. CONTACT:** Damage to underground utility.	1a. Confirm that (if applicable) "Call Before You Dig" and local utility companies were contacted prior to trenching in order to confirm utility mark outs. Must have a case # before digging.
	1b. ENERGY SOURCE/CONTACT: Property damage; Pressurized water mains may cause lacerations or broken bones. Pressurized gas mains may explode causing serious injury, or death. Underground electric may cause severe burns, shock, or death.	1b. Pre-clearing of the trenching location must be conducted to a minimum of 5 vertical feet below the ground surface (10 feet minimum for Critical Zone) using soft digging methods or hand tools (shovel and non-metallic dig bar) prior to trenching. Supervisor should be contacted to discuss appropriate pre-clearing depth. **1b. Complete subsurface clearance checklist**.
	1c. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones.	1c. Be aware of the conditions when walking or loading equipment and working. Walk within established pathway avoiding uneven surfaces. Remove potential slip/trip/fall hazards.
2. Set up work zone.	**2a. CONTACT/CAUGHT:** Cuts/lacerations from equipment. Broken bones from contact by vehicle.	2a. Isolate work area from hazards with cones, barricades, and snow fencing, telescoping poles or temporary chain link fence. Utilize a flag person when necessary (i.e., third party traffic in area). Install traffic signs in roadways and for detours. Spotters will maintain and enforce exclusion zone.
	2b. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones.	2b. See 1c.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Trenching Activity.	**3a. CONTACT:** Serious injury including broken bones, muscle strains or tears, and possibly death due to contact with machine.	3a. Spotter(s) required for all heavy equipment operation. No worker shall be allowed inside the exclusion zone or along the trench/excavation area while any equipment is in operation. A minimum exclusion zone greater than the length of the equipment boom must be established. Workers only allowed in exclusion zone if the operator is in "Hands Off "mode. Operator will not operate equipment until worker is out of exclusion zone. Spotters and operators will have radios for communication, when either loses sight of one another, and/or in case of emergency.
	3b. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones	3b. Any trench/excavation deeper than 3' must have a ladder within 25' of any worker in the excavation. At least 3'(rungs) of the ladder shall be above the top of the excavation. All spoil piles shall be maintained 2' minimum from edge of excavation. 3b. Any trench/excavation deeper than 6' must have fall protection, retractable lanyard for ladder use, and 42" high guardrails along the edge of the trench/excavation.
	3c. EXPOSURE: Noise, Dust, Concrete- Asphalt, petroleum hydrocarbon vapors may cause damage to ears and lungs	3c. Air monitoring using a calibrated photoionization detector (PID) will be used to monitor the breathing zone of the work area. If a reading of >5ppm is recorded, the oversight personnel must temporarily cease work and instruct all Site personnel to step away from the area of elevated readings.
4. Setting Trench protections if necessary.	**4a. CAUGHT:** Injury due to contact with failed trench, may include muscle strains or tears, abrasions or lacerations, broken bones and possibly death.	4a. To prevent cave-ins and avoid caught by/between, excavations over 4' in depth, unless working in stable rock, shall have engineer approved shoring, sheeting or trench box. Top of protection shall be at least 2' above top of excavation.
	4b. CONTACT/CAUGHT: Injury due to rigging activities and entering exclusion zone during lifting and/or transport of shoring/trench box/material may include muscle strains or tears, abrasions or lacerations, broken bones and possibly death.	4b. Use only inspected rigging with 2, 3 or 4 lift points; wear cut-resistant gloves. Rigging to be hooked up to factory installed hook up points on equipment. Control load with non-conductive tag lines with workers out of exclusion zone. Don't stand underneath suspended load; wear steel toed boots and hard hat.
	4c. FALL: Possible injury due to fall into excavation may include muscle strains or tears, abrasions or lacerations, or broken bones.	4c. Shoring to be set and sides will be backfilled to avoid fall hazards before workers are allowed to enter area. Operator will be in "HANDS OFF" mode before workers enter work area to unhook rigging. An inspected ladder extending 3' above top of the shoring will be used to enter and exit the excavation. Workers will use three points of contact when using the ladder.
5. Secure/Leave Site. If backfilling, see excavation backfilling and compaction JSA for potential hazards and critical actions.	**5a. FALL:** Potential Slip, Trip or Fall - may cause muscle strains or tears, abrasions or lacerations, or broken bones.	5a. See 1c. 5a. All open excavations must be backfilled or secured prior to departure with steel plates, orange construction fence or temporary chain link fencing.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-014	DATE: 01/07/2022	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
Generic	**Drilling**	**Hollow Stem Auger Soil Borings / Well Installation**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Douglas Ferraiolo	Project Geologist	Brian Hobbs	CHSD
Tim Unalp	SHSO	Ray Greenidge	Sr. Compliance Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☒ GOGGLES: Spoggles required if winds exceed 15 mph. ☐ FACE SHIELD ☒ HEARING PROTECTION: (as needed). ☒ SAFETY SHOES: Steel or Composite Toe.	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent long-sleeve shirt or long-sleeve shirt and reflective safety vest.	☒ GLOVES: Leather, Cut-Resistant, and Nitrile. ☒ OTHER: Insect Repellant, Sunscreen (as needed).

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Truck-Mounted Drilling Rig or Track Rig, Saw, Hand Tools, Photoionization Detector, Multi-Gas Meter (or equivalent), Interface Probe, 20 lb. Type ABC Fire Extinguisher, 42" Cones & Flags, "Work Area" Signs.

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

"SHOW ME YOUR HANDS"
Driller and helper should show that hands are clear from controls and moving parts

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilization / demobilization and establish a work area.	**1a. See Mobilization/ Demobilization JSA GEN-015.**	1a. See Mobilization / Demobilization JSA GEN-015.
2. Raising tower / derrick of drilling rig.	**2a. CONTACT:** Overhead hazards.	2a. Prior to raising the tower / derrick, the area above the drilling rig will be inspected for overhead hazards (wires, tree limbs, piping or other structures) that may be contacted by the rig's tower or drilling rods. 2a. The tower / derrick must not be raised beneath overhead power lines unless approved by the Roux PM. 2a. Maintain a minimum of 10' from all overhead structures. 2a. Do not move the rig while the tower / derrick is raised.
	2b. CONTACT: Amputation / crush points when raising the rig and instability of rig.	2b. Inspect the equipment prior to use and avoid any potential amputation points. 2b. Lower outriggers to ensure stability prior to raising rig tower derrick. Keep feet and body out of the line of fire when lowering out-riggers. 2b. Inspect the set-up location for uneven terrain. Level or avoid area if needed. 2b. If the rig needs to be mounted, be sure to use three points of contact.
3. Advancement of augers for soil boring installation.	**3a. CONTACT:** Equipment imbalance during advancement of drill equipment.	3a. Drillers will advance the borehole with caution to avoid causing the rig to become imbalanced and / or tip. 3a. The blocking and leveling devices used to secure the rig will be inspected by drillers and Roux personnel regularly to see if shifting has occurred. **3a. Drillers will maintain the "Purple Zone" policy surrounding augers to ensure no personnel come into contact with augers while in use. Workers will spray paint a 3' semi-circle surrounding the augers to visually show that no personnel should enter the "Purple Zone" while drilling activities are being conducted.** 3a. In addition, personnel and equipment that are non-essential to the advancement of the borehole will be positioned away from the rig at a distance that is at least as far as the boom is high (minimum exclusion zone of 20 feet).
	3b. CONTACT: Flying / spraying debris.	3b. Wear all required PPE (especially hand, eye, and ear protection). 3b. Maintain minimum EZ distance (i.e. swing/tip radius of rig) when rig is in operation to avoid potential line of fire hazards from flying materials or debris.
	3c. CAUGHT: Limb/extremity amputation, abrasion, and crushing.	3c. Inspect the equipment prior to use for potential pinch points. 3c. Test all emergency shutdown devices prior to drilling. 3c. Inspect drill head for worn surface or missing teeth; replace if damaged or blunt. 3c. Inspect augers, do not use if auger flight is damaged or bent.
Assess	**Analyze**	**Act**

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
3. Advancement of augers for soil boring installation (Continued).		3c. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. 3c. All non-essential personnel should stay away from the immediate work area; position body out of the line-of-fire of equipment particularly when installing auger flights and steel override casings. 3c. Drillers and helpers will understand and use the "Show Me Your Hands" Policy. 3c. Spinning augers should have an exclusion zone of 20 feet when in operation.
	3d. FALL: Slip/trip/fall hazards.	3d. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 3d. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 3d. Use established pathways and walk on stable, secure ground. 3d. Use three points of contact when mounting or dismounting the rig. 3d. Remove soil cuttings to avoid a tripping hazard from developing near augers.
	3e. EXPOSURE: Inhalation of contamination / vapors.	3e. Air monitoring using a calibrated photoionization detector (PID) to periodically monitor the breathing zone of the work area. 3e. The Action Level for breathing zone air is five parts per million (sustained) as detected by the PID. 3e. If a reading of >5ppm is recorded, the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings and inform the Roux PM of the condition. The Roux PM will then recommend additional appropriate precautions in accordance with the site specific health and safety plan.
	3f. EXPOSURE: Noise and dust.	3f. Wet borehole area with sprayer to minimize dust. Stand upwind and keep body positioned away from rig. 3f. Wear hearing protection while drill rig is operating and / or the noise levels exceed 85 dBA.
	3g. EXERTION: Installing well casings and lifting augers.	3g. Keep back straight and bend at the knees. 3g. Utilize team lifting for objects heavier than 50lbs. 3g. Use mechanical lifting device for odd shaped objects.
4. Installation of well materials.	**4a. CONTACT:** Installing well materials while also pulling up augers. **4b. CAUGHT:** Possible pinch or crush hazard assembling PVC and sending down the borehole. **4c. FALL:** Slip/trip/fall hazards with hand tools and materials. **4d. EXPOSURE:** Potential contamination, harmful vapors, dust, and / or noise. **4e. EXERTION:** Lifting heavy bags of materials to backfill borehole.	4a. Potential contact with augers during installation of well materials. 4a. Keep distance from augers and do not place any materials while augers are in motion. 4b. Keep all body parts out of potential pinch points while placing PVC together and sending down borehole. 4c. See 3d. 4d. See 3e and 3f. 4d. Stand upwind to avoid exposure to dust generated from packing materials. 4e. See 3g.
5. Cleaning the auger flights	**5a. CONTACT:** Cuts/scrapes or puncture wound from contacting auger.	5a. Follow "Show Me Your Hands" Procedure and make sure auger is out of gear before contacting auger with tool or hand. 5a. Pull cleaning tool across your body with handle away from body; do not push toward the auger. 5a. Do not clean more than ¾ turn around the auger at a time. 5a. Wear cut resistant and leather gloves. 5a. Always use two hands to operate cleaning tool. 5a. Inspect tool before use and remove from service if handle or metal are cracked/fatigued. 5a. Stand out of the line of fire.
6. Decontaminate equipment.	**6a. EXPOSURE / CONTACT:** To contamination (e.g., contaminated groundwater, vapors). **6b. EXPOSURE**: To chemicals in cleaning solution (including ammonia).	6a. Wear chemical-resistant disposable gloves and safety glasses. 6a. Contain decontamination water so that it does not spill. 6a. Use an absorbent pad to clean spills, if necessary. 6b. See 3e. Wear all appropriate PPE and stand upwind of any exposed cleaning solutions.

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-015	DATE: 01/07/2022	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)	
GENERIC	**Site Recon**	**Mobilization/Demobilization**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Tim Unalp	SHSO	Brian Hobbs	CHSD
Ray Greenidge	Sr. Compliance Manager		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION (as needed) ☒ SAFETY SHOES: Steel Toe or composite toe	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest of high-visibility clothing; long sleeve shirt; long pants	☒ GLOVES: Leather, nitrile, and cut resistant (as needed) ☐ OTHER

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Varies

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilize/demobilize and establish work area	**1a. FALL:** Slip/trips/falls from obstructions, uneven terrain, weather conditions, heavy loads, and/or poor housekeeping.	1a. Use 3 points-of-contact/ensure secure footing when entering and exiting vehicle. 1a. Inspect walking path for uneven terrain, steep hills, obstructions, and/or weather-related hazards (i.e., ice, snow, and puddles) prior to mobilizing equipment. Use established pathways. Walk on stable/secure ground. 1a. Do not climb over stored materials/equipment; walk around. Practice good housekeeping; organize and store equipment neatly in one area at its lowest potential energy. 1a. Wear boots with adequate treads. 1a. Delineate unsafe areas with 42” cones, caution tape and/or flagging.
	1b. CONTACT: Personal injury and/or property damage caused by being struck by Site traffic or equipment used in Site activities.	1b. Observe and maintain the posted speed limits. 1b. When first arriving onsite, park vehicles in designated parking space and/or out of the way locations. Use parking brake on all vehicles and tire chocks on work trucks and trailers. 1b. Check in with Site Manager/Supervisor to ensure coordination with other Site activities and to discuss any special hazards. Ensure that short-service employees (SSE) are identified. 1b. Identify potential traffic sources. 1b. Wear PPE including high visibility clothing or reflective vest. 1b. Use a spotter while moving work vehicles; plan ahead to avoid backing whenever possible. 1b. Maintain a minimum exclusion zone when vehicles are in motion (i.e. greater than swing/tip radius of equipment). When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver-to-spotter visibility. 1b. Delineate work area with 42” cones, flags, caution tape, and/or other barriers. 1b. Position “Work Area” signs at Site entrances, if possible, or at either side of work area.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
		1b. Position largest vehicle to protect against oncoming traffic. 1b. Face traffic, maintain eye contact with oncoming vehicles, use a spotter, and establish a safe exit route. 1b. Observe potential overhead and ground surface features that may interfere with moving equipment. Clear the path of physical hazards prior to initiating mobilization.
	1c. CAUGHT: Personal injury from pinch points and being in line-of-fire of vehicle and/or equipment.	1c. Make sure driver has engaged parking brake and placed wheel chocks in a position to prevent movement. Be sure that vehicle is parked in front/down gradient (positioned to best block oncoming traffic) of work area. 1c. Wear leather gloves when handling any tools or equipment. Wear cut-resistant gloves (Kevlar or similar) when handling sharp objects/cutting tools/glass. 1c. Keep body parts away from line-of-fire of equipment. 1c. Always carry tools by the handles and/or designated carrier. Ensure sharp-edged tools are sheathed/secure. 1c. Remove any loose jewelry. Avoid wearing loose clothing and/or ensure loose clothing is secure. 1c. Secure all items on the equipment, tighten up any items or features that have potential to shift or break during mobilization.
	1d. OVEREXERTION: Muscle strains while lifting/carrying equipment.	1d. Use body positioning and lifting techniques that avoid muscle strain; keep back straight, lift with legs, turn with whole body, keep load close to body, and never reach with a load. 1d. Ensure that loads are balanced. Use assistance (mechanical or additional person) to carry equipment that is either unwieldy or over 50 lbs.
	1e. EXPOSURE: Personal injury from exposure to biological and environmental hazards.	1e. Inspect area to avoid contact with biological hazards (i.e. poisonous plants, stinging insects, ticks, etc.). 1e. Wear long sleeved clothes treated with Permethrin, apply insect repellant containing DEET to exposed skin, and inspect clothes and skin for ticks during and after work. 1e. Apply sunscreen (SPF 15+) if exposure to sun for 30 minutes or more is expected.
	1f. EXPOSURE: Weather related injuries.	1f. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, nausea, rapid and shallow breathing). Take breaks in cool places and hydrate as needed. 1f. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks in warm areas as needed. 1f. Wear clothing appropriate for weather and temperature conditions (e.g., rain jackets, snow pants, multiple layers). 1f. If lightning is observed, wait 30 minutes in a sheltered location (car is acceptable) before resuming work.
	1g. EXPOSURE: Personal injury from noise hazards.	1g. Wear hearing protection if sound levels exceed 85 dBA (if you must raise your voice for normal conversation).

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-019	DATE: 01/13/2022	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Site Reconnaissance**	**Site Walk and Inspection**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Sara Barrientos	Project Geologist	Brian Hobbs	Corporate Health and Safety Director
Tim Unalp	SHSO	Joe Duminuco	Executive Vice President
		Ray Greenidge	Sr. Compliance Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION: ear plugs as necessary ☒ SAFETY SHOES: Steel or composite toed	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: High-visibility vest or high-vis outerwear	☒ GLOVES: Leather/cut-resistant/chemical resistant ☒ OTHER: Tyvek and rubber boots as necessary, dust mask as necessary

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Site map, emergency contact list, documentation of urgent care/hospital routes and / or guide familiar with Site, operating cell phone or walkie-talkie if Site allows, and bug spray.

Commitment to Safety – All personnel onsite will actively participate in SPSA performance by verbalizing SPSAs throughout the day.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

SITE SECURITY: Prior to site inspection verify appropriate method to address Site Security concerns as it relates to potential criminal activity, homeless population, and/or isolation concerns. Work with the Project Principal and/or Project Manager to address appropriately.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Check in with Site contact.	**1a. CONTACT/EXPOSURE/FALL:** Personal injury caused by lack of awareness of site-specific hazards.	1a. Inquire about hazards and other activities taking place at the Site. 1a. Inform Site contact of work scope, timeline and location(s). 1a. Discuss emergency evacuation procedures and muster points with Site contact.
2. Traversing the Site	**2a. CONTACT:** Property damage and personal injury caused by obstructions/vehicles or unauthorized personnel at remote Sites. **2b. FALL:** Uneven terrain and weather conditions. Overgrown shrubs and vines. Equipment in the work zone. **2c. OVEREXERTION:** Muscle strain while carrying equipment. **2d. EXPOSURE:** Biological hazards – ticks; bees/wasps; poison ivy; insects; (Ticks are most active any time the temperature is above freezing, typically from March to November.)	2a. All equipment must be stowed and secured prior to moving. 2a. Maintain speed limit as posted on-site. 2a. When possible, drive on established roadways. 2a. Yield to all pedestrians. 2a. Use pull-through spots or back into parking spots. 2a. Don high visibility clothing/safety vest. If working at remote Site, add orange accessories during hunting season. 2b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 2b. When possible, use established pathways and walk on stable, secure ground. 2b. Communicate traversing hazards with others. 2c. When carrying equipment to/from work area, use proper lifting techniques; keep back straight, lift with legs, keep load close to body, never reach with a load. Ensure that loads are balanced to reduce the potential for muscle strain. Use the buddy system or mechanical means to maneuver items heavier than 50-lb. If necessary, make multiple trips to carry equipment. 2d. Inspect area to avoid contact with biological hazards. 2d. Ticks: • Treat outer clothing including pants, shirts, socks, boots and hats the evening before with Permethrin (allowing at least two hours before use). • Apply DEET to exposed skin before travelling to the Site and reapply after two hours. • Check for ticks during and after work. 2d. Bees: • Use bee spray as appropriate to deter/eliminate bees.

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	2e. EXPOSURE: Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions.	• Protect exposed skin with insect repellent. 2d. Poison Ivy: • Identify areas of poison ivy and spray with weed killer. Don Tyvek and rubber boots while traversing poison ivy areas. • If skin contacts poison ivy, wash skin thoroughly with soap and water. 2e. Wear sunscreen with SPF 15 or greater on exposed skin whenever 30 minutes or more of sun exposure is expected. 2e. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed. 2e. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed. 2e. Wear appropriate rain gear as needed. 2e. Take frequent breaks if tired, wet, or cold/hot. Drink water. 2e. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again.
3. Walking near heavy equipment and machinery.	**3a. CONTACT:** Personal injury from Site and roadway traffic. Personal injury from flying debris **3b. OVEREXERTION:** Personal injury from lifting/moving/rotating equipment. **3c. EXPOSURE:** Hearing damage from noise generating equipment/processes. Inhalation/exposure to hazardous vapors and or dust. **3d. EXPOSURE:** Working in a remote area.	3a. See 2a. 3a. Maintain an exclusion zone of at least 10'-25' feet from all engaged equipment. 3a. Keep body parts out of the line-of-fire of pinch points. 3a. Wear appropriate PPE always. 3b. See 2c. 3c. Wear hearing protection if >85 dBA. (i.e. noise levels which require you to raise your voice to communicate) 3c. Always wear leather gloves when handling any tools or equipment. 3c. Always wear appropriate PPE based off chemicals present. 3d. Use the "buddy system" whenever possible. If working alone, contact PM upon arrival/departure, as well as during work activities prior to commencing work if applicable. 3d. Always carry a communication device (i.e., cell phone, walkie-talkie) or directional (i.e., map, compass, etc.) when traversing remote areas. 3d. If available, follow Lone Worker Protocol/Procedure.
4. Working in adverse weather conditions.	**4a. EXPOSURE:** Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions.	4a. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed. 4a. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed. 4a. Wear appropriate rain gear as needed. 4a. Take frequent breaks if tired, wet, or cold/hot. Drink water. 4a. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again.
5. Departing Site.	**5a. EXPOSURE:** Exposure to unnecessary hazards should personnel believe Roux is on-Site during an emergency and conduct a search.	5a. Sign out or notify Site contact and Roux Project Manager of your departure.

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JOB SAFETYANALYSIS Ctrl. No. GEN-020	DATE: 01/13/2022	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
GENERIC	**Gauging & Sampling**	**Soil Sampling**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
MaryBeth Lyons	Project Scientist	Brian Hobbs	CHSD
Tim Unalp	SHSO	Ray Greenidge	Sr. Compliance Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES ☒ FLAME RESISTANT CLOTHING (as needed)	☐ GOGGLES ☐ FACE SHIELD: ☒ HEARING PROTECTION: (as needed) ☒ SAFETY SHOES: Composite-toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Insect repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Recommended Equipment: 42" traffic cones, caution tape, trowel

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Secure location	**1a. CONTACT:** Personnel and vehicular traffic may enter the work area.	1a. If in an area with foot or vehicle traffic, delineate the work area with 42" traffic cones and/or caution tape to prevent exposure to traffic and inform others of work activity. 1a. Wear reflective vest and/or high visibility clothing. 1a. Face the direction of any vehicular traffic. Position vehicle to protect worker from traffic. 1a. Communicate work activity with adjacent work areas.
	1b. FALL: Tripping/falling due to uneven terrain or entry/exit from excavations.	1b. Inspect pathways and work area for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions. 1b. Use established pathways and walk on stable, secure ground. 1b. Stage equipment and tools in a convenient, stable, and orderly manner. Store equipment at lowest potential energy. 1b. Roux employees should stay 5 feet from in-progress excavations and trenches. Should entry to an excavation be required (when stabilization is complete), ladders must be employed for steep embankments, excavations, pits, and trenches.
	1c. EXPOSURE: Exposure to sun and excessive heat, possibly causing sunburn, heat exhaustion or heat stroke. Exposure to cold temperatures possibly causing cold stress. Skin burn as a result of fire, if applicable. Exposure to explosive vapors due to tank farm operations. Exposure to airborne dust due to high wind speeds. Biological hazards - ticks, bees/wasps, poison ivy, thorns, insects, etc.	1c. Wear sunscreen with an SPF 15 or greater whenever 30 minutes or more of exposure is expected. 1c. Use a tent to shade the work area from direct sunlight particularly when warm temperatures are expected. 1c. Be aware of the location of all Site personnel. 1c. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). 1c. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). 1c. Take breaks for rest and water as necessary. Move to an area that is well shaded or a climate controlled area (i.e., car, site trailer, etc.). 1c. No open flames/heat sources. 1c. Conduct air monitoring and ensure that harmul vapor concentrations are within the levels detailed in the Site Specific HASP. Follow procedures detailed in HASP for exceedances. 1c. Flame retardant clothing must be worn when specified by Site policy. 1c. Cell phones should be disabled when specified by Site policy. 1c. Pre-treat field clothing with Permethrin prior to site visit to kill ticks and insects. 1c. Wear long sleeved shirts and tuck in (or tape) pant legs into socks or boots to prevent ticks from reaching skin. 1c. Spray insect repellant containing DEET on exposed skin when working in overgrown areas of the Site. 1c. Inspect area to avoid contact with biological hazards. 1c. Wear cut-resistant gloves when handling branches, shrubs, etc. that may lie within the walking path. 1c. Wear spoggles if the average wind speeds are above 15 mph. 1c. Personnel shall examine themselves and co-worker's outer clothing for ticks periodically when onsite. 1c. If skin comes in contact with poison ivy, wash skin thoroughly with soap and water. If rash persists after washing, immediately notify your supervisor, the OM and OHSM for possible consultation with a physician at an approved Occupational Health Clinic.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
2. Collect Soil Sample	**2a. CONTACT:** Personal injury from pinch points, cuts, and abrasions from sampling equipment tools, and material within soil sample. Personal injury from contact with moving equipment while sampling. Personal injury from contact with glass sample jars.	2a. Wear cut-resistant (i.e., Kevlar) gloves under chemical-resistant (nitrile) disposable gloves when handling soil samples and sampling jars. 2a. Where possible, use trowel or equivalent tool to avoid contact with soil. 2a. If sampling from bucket of heavy equipment, ensure all equipment is off and operator utilizes the “show me your hands” policy. 2a. See 1a.
	2b. EXPOSURE: Exposure to contamination (impacted soil) and/or lab preservatives.	2b. Wear chemical-resistant (nitrile) disposable gloves over cut resistant gloves to protect hands when handling samples; use containment material or plastic sheeting to protect surrounding areas. 2b. Wear safety glasses to protect eyes from dust or air-borne contaminants that may results from disturbing the soil. 2b. Where possible, remain upgradient from sample location if collecting soil sample from stockpile, drill rig, etc. to avoid breathing contaminant vapors, if they are present. 2b. When collecting soil sample from hand auger, put large zip lock bag over entire auger to prevent spillage of soil on to the ground. 2b. Open sample jars slowly and fill carefully to avoid contact with preservatives.
	2c. EXERTION: Exertion due to repetitive motion and ergonomics.	2c. Utilize a table or raised surface for soil sampling if multiple soil samples are going to be taken to minimize repetitive bending motion.
3. Decontaminate equipment	**3a. EXPOSURE/CONTACT:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated vapors and/or soil). **3b. EXPOSURE:** Chemicals in cleaning solution including ammonia.	3a. Wear chemical-resistant (nitrile) disposable gloves and safety glasses. 3a. Use an absorbent pad to clean spills. 3a. Properly dispose of used materials/PPE in provided drums in designated drum storage area. 3a. Remain upwind of sample and avoid breathing contaminant vapors, if they are present. 3b. Wear chemical-resistant (nitrile) disposable gloves and safety glasses. 3b. Work on the upwind side of decontamination area. 3b. Use an absorbent pad to clean spills. 3b. Properly dispose of used materials/PPE in provided drums in designated drum storage area. Ensure that all drums are properly labeled and secured.

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-021	DATE: 01/13/2022	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Gauging and Sampling**	**Soil Vapor Sampling (Permanent Monitoring Points)**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Jeff Wills	Senior Hydrogeologist	Brian Hobbs	CHSD
Tim Unalp	SHSO	Ray Greenidge	Sr. Compliance Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut-resistant & Nitriles
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☒ OTHER: Bug Spray, Sun Screen, Knee Pads or kneeling pad
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel-toe boots		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

9/16" Socket and Wrench, Non-Toxic Clay, Teflon-Lined Tubing, Masterflex Tubing, Air Pump with Low Flow, Dry Cal, Enclosure (Bucket with 2 holes), Helium Gas Canister, Summa Canisters and Flow Controllers, MultiRae Photo Ionization Detector (PID), Helium Detector, Tubing Cutter, 42-inch Safety Cones, Caution Tape or Retractable Cone Bars

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

Work Zone (WZ): A 5-foot exclusion zone will be maintained for non-essential personnel.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Define and secure work area.	**1a. FALL:** Potential tripping hazards.	1a. Ensure work area is secure and inform others (third party) of work activity. 1a. Remove tripping hazards and inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment.
	1b. CONTACT: Potential contact with moving vehicles or pedestrians.	1b. If working alongside roads, look both ways before entering roadways, face traffic, and utilize work vehicle to protect employees. 1b. Delineate work area (including vehicles) with traffic safety cones and caution tape or retractable cone bars. 1b. Maintain a 5-foot exclusion zone. 1b. Wear high visibility clothing or reflective safety vest.
	1c. EXERTION: Muscle strain while lifting and carrying equipment.	1c. When carrying equipment to/from work area, keep back straight, lift with legs, keep load close to body, never reach with a load. Ensure that loads are balanced. Use the buddy system or mechanical means to maneuver loads heavier than 50-lbs. If necessary, make multiple trips to carry equipment.
2. Remove well cover / close well cover.	**2a. CONTACT/CAUGHT:** Pinch points and scrapes associated with hand tools and well covers.	2a. Keep hands away from pinch points. 2a. Use hand tools with extensions or magnet to remove and replace well covers. 2a. Wear cut-resistant gloves. 2a. Use knee pads or kneeling pad when repetitive kneeling on rough ground is anticipated.
	2b. FALL: Potential tripping hazards associated with installing bolts.	2b. Place security bolts in secure location so not to create tripping hazards. Replace security bolts so that they fit flush with monitoring well covers.
	2c. EXERTION: Physical exertion to remove bolts that were over torqued or stripped.	2c. Replace any security bolts that show signs of stripping. Do not over tighten. 2c. Use body positioning and bending techniques that minimize muscle strain; keep back straight, bend at the knees. 2c. See 2a.

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[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – Electricity, pressure, tension/compression, torque.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Screen vapor point with PID.	**3a. FALL:** Potential tripping hazards associated with equipment. **3b. EXPOSURE:** Inhalation of soil vapor	3a. Place equipment in one area close to the sampling location. 3a. Identify area where equipment is to be stored within the work area (away from main walking path). 3a. Don't leave equipment on the ground. Return equipment to storage area between uses. 3b. Replace brass caps immediately upon completion to avoid soil vapors migrating to the surface through sample tubing. 3b. Stand upwind of sample point during screening activities.
4. Remove / replace brass caps at the end of the sam`ple tubing.	**4a. CONTACT:** Pinch points associated with hand tools and brass caps. **4b. EXPOSURE:** Potential pathway for vapors to migrate to land surface.	4a. Use wrench to remove and replace brass caps. 4a. Wear cut-resistant gloves to protect against pinch points and scrapes. 4b. See 3b. 4b. Stand up wind of sample point location.
5. Set up soil vapor sampling equipment and calibration of meters.	**5a. FALL:** Potential tripping hazards associated with equipment and tubing.5b. **5b. CONTACT:** Pinch points associated with handling equipment. **5c. EXPOSURE:** Inhalation of calibration gas and helium.	5a. See 3a. 5a. Keep tubing slack to a minimum and locate the summa canister as close to the sampling location as possible. 5a. Avoid stepping over equipment and tubing. 5b. Do not place fingers/hands under sampling equipment. 5b. Make multiple trips when unloading equipment in work area. 5b. Wear cut-resistant gloves to protect against pinch points while handling sampling equipment. 5c. Review SDS for each type of calibration gas used before calibrating. 5c. Calibrate meters in a well-ventilated area and keep air flow regulator away from face. 5c. Close valve on canisters after use to avoid inhalation of excess helium or calibration gas. 5c. Stand up wind of bucket during helium tracer gas test.
6. Cleaning Work Area.	**6a. FALL:** Potential tripping hazards associated with equipment and tubing. **6b. CONTACT:** Storing and transport of equipment in car.	6a. See 3a. 6a. See 3b. 6b. Ensure that equipment is placed securely in the vehicle. Do not stack equipment on top of each other. Secure equipment so that it will not slide while being transported. 6b. Wear cut-resistant gloves while handling/loading equipment.

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JOB SAFETY ANALYSIS	Cntrl. No. GEN-027	DATE: 01/14/2022	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Drilling**	**Pre-Drilling Clearance, Vactron and Air Knife**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Courtney Rempfer	Project Scientist	Joseph Midwig	Senior Engineer
Sara Redding	Senior Hydrogeologist	Brian Hobbs	CHSD
		Ray Greenidge	Sr. Compliance Mgr.

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☒ FACE SHIELD (While Air Knifing) ☒ HEARING PROTECTION (As needed) ☒ SAFETY SHOES: Composite toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing; long-sleeve shirt	☒ GLOVES: Leather, Nitrile, cut-resistant ☒ OTHER: Dusk mask, insect repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Vac-Truck or Vac Drum, Compressor, Jack Hammer, Air Knife. Circular Saw, Hand Tools, Dust Mask, Photoionization Detector, Multi Gas Meter, 42 inch safety cones and flags, Retractable Cone Bars, Caution Tape, 20 lb. Fire Extinguisher, "Work Area" Signs, Pressurized Water Sprayer

Commitment to Safety – All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE: All non-essential personnel will maintain a distance of 10 feet from drilling equipment while equipment is moving/engaged

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Verify pre-clearance protocol	**1a. CONTACT:** Underground utility damage; property damage; personal injury.	1a. Confirm that (if applicable) "Call Before You Dig" and local utility companies were contacted prior to starting work in order to confirm utility mark outs. Must have a case # before digging. 1a Walk the Site to evaluate utility markings and review maps (see Site Walk Inspection JSA - GEN-019). Utilities are not always properly marked out, ensure use of observational skills through the pre-clearing checklist. 1a. Review pre-clearing checklist form and sub-surface clearance form. Pre-clearing protocol indicates that clearance must be conducted to a minimum of 5 vertical feet below ground surface or 10 vertical feet below ground surface in the critical zone using hand tools.
	1b. ENERGY SOURCE/CONTACT: Property damage; Pressurized water mains may cause lacerations or broken bones. Pressurized gas mains may explode causing serious injury, or death. Underground electric may cause severe burns, shock, or death.	1b. Pre-clearing of each soil boring/monitoring well location must be conducted to a minimum of 5 vertical feet below the ground surface (10 feet minimum for Critical Zone) using hand tools (shovel and non-metallic dig bar and hand auger) prior to drilling. Supervisor should be contacted to discuss appropriate pre-clearing depth. 1b. MUST Complete subsurface clearance checklist prior to pre-clearance.
	1c. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones.	1c. Be aware of the conditions when walking or loading equipment and working. Walk within established pathway avoiding uneven surfaces. Remove potential slip/trip/fall hazards.
2. Mobilize/demobilize and establish work area	**2a. SEE MOBILIZATION / DEMOBILIZATION JSA – GEN-015**	2a. See Mobilization / Demobilization JSA.
3. Concrete saw cutting, jack hammer and hand clearance with hand tools, air knife	**3a. CONTACT:** Flying debris striking face or body	3a Maintain 10' minimum exclusion zone. Use the required PPE (i.e., leather/cut proof gloves, safety glasses/face shield). 3a. Use anti-whip devices on compressor hoses. Ensure hose couplings are secure. 3a Wear a face shield to protect face from flying debris when using air knife. 3a. Utilize a traffic cone, cage or physical barriers over the hole during air knife activities to keep flying debris close to ground.
	3b. EXPOSURE: Inhalation/exposure to hazardous vapors and/or concrete dust, noise exposure	3b. Monitor breathing zone with a calibrated PID and/or multi-gas meter. If meters sustain readings greater than recommeneded in the HASP for the specific contaminant of concerns (COCs) the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings. Contact PM. 3b. Wet concrete while using saw to minimize dust and wear dust mask to prevent inhalation. 3b. Stand upwind and keep body behind saw. Observers and helpers should avoid line-of-fire for saw blade. Always cut away from body. 3b. No open flames/heat sources.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

	3c. ENERGYSOURCE/CONTACT: Property damage; Pressurized water mains may cause lacerations or broken bones. Pressurized gas mains may explode causing serious injury, or death. Underground electric may cause severe burns, shock, or death.	3b. Wear hearing protection when saw, jackhammer or air compressor are in operation. Otherwise, if sound levels exceed 85 dbA, put on hearing protection. 3c. For air knifing, ensure extention/lance tip reaches the full 5 feet bgs. Air knife should be advanced **AT A MINIMUM** in all four corners of the expected boring location to find any possible arrangement of utilities. 3c. Ensure diameter of soil preclearance hole is at a **MINIMUM 2x** the diameter of any drilling or hard dig equipment that will be entering the hole. 3c. See Complete subsurface clearance protocol for information provided above.
	3d. ERGONOMICS/EXERTION: Muscle strain due to poor body positioning when handling equipment and materials	3d. Use body positioning and lifting techniques that minimizes muscle strain; keep back straight, lift with legs, keep load close to body, and never reach with a load. 3d. Ensure that loads are balanced to reduce the potential for muscle strain. 3d. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift.
	3e. FALL: Tripping/falling due to uneven terrain, weather conditions, and materials/equipment stored at the Site	3e. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. Mob/Demob JSA. 3e. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 3e. Use established pathways and walk on stable, secure ground. 3e. Equipment and tools will be stored at the lowest point of potential energy and out of the walkway and immediate work area (i.e. tools should not be propped against walls or nearby equipment or vehicles). 3e. Equipment and tools that are not anticipated to be used will be returned to a storage area that is out of the immediate work area. 3e. Ensure power cords and compressed air lines are grouped when used within the work area. 3e. Pre-cleared location will be finished flush to grade as to prevent a slip/trip hazard or coned and taped off.
	3f. CAUGHT: Amputation points associated with the equipment and vacuum hose	3f. Always wear leather gloves when making connections and using hand tools; wear cut-resistant (i.e., Kevlar) gloves when handling cutting tools. 3f. Inspect the equipment prior to use for potential pinch points. 3f. Test all emergency shutdown devices prior to using equipment. 3f. Inspect saw blade for worn surface or missing teeth; switch blade if damaged or blunt. 3f. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. 3f. All non-essential personnel shall maintain a 10 foot exclusion zone; position body out of the line-of-fire of equipment. 3f. Drillers and helpers will understand and use the “Show Me Your Hands Policy”.
4. Move drum to staging area using drum cart	**4a. EXPOSURE/CONTACT:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, soil)	4a. Wear Nitrile chemical-resistant gloves under leather or cut proof gloves. 4a. Do not overfill drums. Ensure that the drum lids are attached securely. 4a. All drums will be staged in the designated storage area.
	4b. EXERTION: Muscle strain while maneuvering drums with drum cart/lift gate	4b. See 3d. Do not overfill drums. Use lift gate on back of truck to load and unload drums. Use drum dolly to move drum.
	4c. CAUGHT: Pinch points associated with handling drum lid	4c. Ensure that fingers are not placed under the lid of the drum. Wear leather gloves or cut proof gloves. Use appropriate ratchet while sealing drum lid.
5. Decontaminate equipment.	**5a. EXPOSURE/CONTACT**: To contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors).	5a. Wear chemical-resistant disposable gloves and safety glasses. 5a. Contain decontamination water so that it does not spill. 5a. Use an absorbent pad to clean spills, if necessary. 5a. Spray equipment from side angle, not straight on, to avoid backsplash. 5a. See 3b.
	5b. EXPOSURE: To chemicals in cleaning solution.	5b. See 4a. Review SDS to ensure appropriate precautions are taken and understood.

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APPENDIX B

SDSs for Chemicals Used

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: Alconox

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Supplier
Not Applicable

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:

Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

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according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

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Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

8 Exposure controls/personal protection

8.1 Control parameters :

7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3.

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition temperature:**	Not determined or not available.

Safety Data Sheet

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Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

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Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** None **Label:** None **LTD. QTY:** None

US DOT

Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Comments: None	**Comments:** None
14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Germany MAK: Not classified.

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NFPA: 1-0-0

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

HMIS: 1-0-0

Hydrochloric Acid,ACS

SECTION 1: Identification of the substance/mixture and of the supplier

Product name: **Hydrochloric Acid,ACS**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25358**

Recommended uses of the product and restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific, Inc
9 Barnhart Drive, Hanover, PA 17331
(717) 632-1291

Supplier Details:

Fisher Science Education
6771 Silver Crest Road, Nazareth, PA 18064
(724)517-1954

Emergency telephone number:

Fisher Science Education
Emergency Telephone No.: 800-535-5053

SECTION 2: Hazards identification

Classification of the substance or mixture:

Corrosive
Serious eye damage, category 1
Corrosive to metals, category 1
Skin corrosion, category 1B

Irritant
Specific target organ toxicity following single exposure, category 3

Corr. Metals 1.
Corr. Skin 1B.
Eye Damage 1.
STOT. SE 3.

Signal word: Danger

Hazard statements:

May be corrosive to metals.
Causes severe skin burns and eye damage.
May cause respiratory irritation.

Precautionary statements:

If medical advice is needed, have product container or label at hand.
Keep out of reach of children.
Read label before use.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Keep only in original container.
Do not get in eyes, on skin, or on clothing.
Wash skin thoroughly after handling.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
Specific treatment (see supplemental first aid instructions on this label).
Wash contaminated clothing before reuse.
Absorb spillage to prevent material damage.
Store in a well ventilated place. Keep container tightly closed.
Store locked up.
Store in corrosive resistant stainless steel container with a resistant inner liner.
Dispose of contents and container to an approved waste disposal plant.

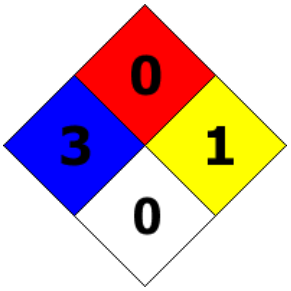
Other Non-GHS Classification:

WHMIS

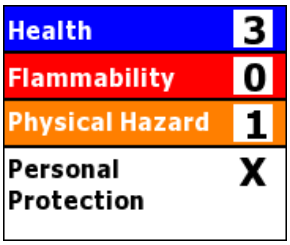
D1A 

E 

NFPA/HMIS



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3: Composition/information on ingredients

Ingredients:		
CAS 7647-01-0	Hydrochloric Acid, ACS	30-50 %
CAS 7732-18-5	Water	50-70 %
		Percentages are by weight

SECTION 4: First aid measures

Description of first aid measures

After inhalation:

Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position. Seek medical attention if irritation or coughing persists.

After skin contact:

Wash affected area with soap and water. Immediately remove contaminated clothing and shoes. Rinse

thoroughly with plenty of water for at least 15 minutes. Immediately seek medical attention.

After eye contact:

Protect unexposed eye. Flush thoroughly with plenty of water for at least 15 minutes. Remove contact lenses while rinsing. Continue rinsing eyes during transport to hospital.

After swallowing:

Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Immediately seek medical attention.

Most important symptoms and effects, both acute and delayed:

Inhalation may cause irritation to nose and upper respiratory tract, ulceration, coughing, chest tightness and shortness of breath. Higher concentrations cause tachypnoea, pulmonary oedema and suffocation. Ingestion may cause corrosion of lips, mouth, oesophagus and stomach, dysphagia and vomiting. Pain, eye ulceration, conjunctival irritation, cataracts and glaucoma may occur following eye exposure. Erythema and skin irritation, as well as chemical burns to skin and mucous membranes may arise following skin exposure. Potential sequelae following ingestion of hydrochloric acid include perforation, scarring of the oesophagus or stomach and stricture formation causing dysphagia or gastric outlet obstruction. In some cases, RADS may develop. Respiratory symptoms may take up to 36 hours to develop. Symptoms of burning sensation, cough, wheezing, laryngitis, shortness of breath, spasm, inflammation, edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Indication of any immediate medical attention and special treatment needed:

Provide SDS to Physician. Physician should treat symptomatically.

SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing agents:

Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

Unsuitable extinguishing agents: None

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors. If in contact with metals toxic fumes may be released.

Advice for firefighters:

Protective equipment:

Wear protective eyeware, gloves, and clothing. Refer to Section 8. Wear respiratory protection.

Additional information (precautions):

Thermal decomposition can produce poisoning chlorine. Hydrochloric acid reacts also with many organic materials with liberation of heat. Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation. Ensure that air-handling systems are operational.

Environmental precautions:

Should not be released into environment. Prevent from reaching drains, sewer, or waterway.

Methods and material for containment and cleaning up:

Always obey local regulations. If necessary use trained response staff or contractor. Evacuate personnel to safe areas. Containerize for disposal. Refer to Section 13. Keep in suitable closed containers for disposal. Soak up

with inert absorbent material and dispose of as hazardous waste. Cover spill with soda ash or calcium carbonate. Mix and add water to form slurry. Wear protective eyeware, gloves, and clothing. Refer to Section 8.

Reference to other sections: None

SECTION 7: Handling and storage

Precautions for safe handling:

Prevent formation of aerosols. Never use hot water and never add water to the acid. Do not allow contact between hydrochloric acid, metal, and organics. Follow good hygiene procedures when handling chemical materials. Refer to Section 8. Prevent contact with skin, eyes, and clothing. Follow proper disposal methods. Refer to Section 13. Do not eat, drink, smoke, or use personal products when handling chemical substances. Use only in well ventilated areas. Avoid splashes or spray in enclosed areas.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Keep away from food and beverages. Protect from freezing and physical damage. Store away from incompatible materials. Provide ventilation for containers. Keep container tightly sealed. Containers for hydrochloric acid must be made from corrosion resistant materials: glass, polyethylene, polypropylene, polyvinyl chloride, carbon steel lined with rubber or ebonite.

SECTION 8: Exposure controls/personal protection




Control Parameters:	7647-01-0, Hydrochloric Acid, ACGIH: 2 ppm Ceiling. 7647-01-0, Hydrochloric Acid, NIOSH: 5 ppm Ceiling; 7 mg/m3 Ceiling.
Appropriate Engineering controls:	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor and mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of handling.
Respiratory protection:	Not required under normal conditions of use. 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. When necessary use NIOSH approved breathing equipment.
Protection of skin:	Select glove material impermeable and resistant to the substance. Select glove material based on rates of diffusion and degradation. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Use proper glove removal technique without touching outer surface. Avoid skin contact with used gloves. Wear protective clothing.
Eye protection:	Faceshield (8-inch minimum). Tightly fitting safety goggles.
General hygienic measures:	Perform routine housekeeping. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes, and clothing. Before rewearing wash contaminated clothing.

SECTION 9: Physical and chemical properties

Appearance (physical state, color):	Clear, colorless liquid.	**Explosion limit lower**: **Explosion limit upper**:	Non Explosive Non Explosive
Odor:	Pungent odor	**Vapor pressure at 20°C**:	5.7mmHg @ 0C

Hydrochloric Acid,ACS

Odor threshold:	0.3 – 14.9 mg/m3	**Vapor density**:	1.27 (Air=1)
pH-value:	< 1	**Relative density**:	1.0 - 1.2
Melting/Freezing point:	- 74 C	**Solubilities**:	Miscible.
Boiling point/Boiling range:	81.5 - 110 C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Applicable	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	>1.00	**Decomposition temperature**:	Not Determined
Flammability (solid, gaseous):	non combustible	**Viscosity**:	a. Kinematic: Not Determined b. Dynamic: Not Determined
Density at 20°C:	Not Determined **Hydrochloric Acid:**MW is36.46		

SECTION 10: Stability and reactivity

Reactivity:

Reacts violently with bases and is corrosive.

Chemical stability:

No decomposition if used and stored according to specifications.

Possible hazardous reactions:

Attacks many metals in the presence of water forming flammable explosive gas (hydrogen). Reacts violently with oxidants forming toxic gas (chlorine).

Conditions to avoid:

Incompatible materials.

Incompatible materials:

Bases, Amines, Alkali metals, Metals, permanganates (potassium permanganate), Fluorine, Metal acetylides, Hexalithium disilicide.

Hazardous decomposition products:

Hydrogen chloride gas. Carbon oxides.

SECTION 11: Toxicological information

Acute Toxicity:

Oral:

7647-01-0 LD50 Rat 238 - 277 mg/kg

Dermal:

7647-01-0 LD50 Rabbit >5010 mg/kg

Inhalation:

7647-01-0 LD50 Rat 3124 ppm/hour

Chronic Toxicity: No additional information.

Corrosion Irritation:

Dermal:

7647-01-0 Skin - rabbit Result: Causes burns.

Ocular:

7647-01-0 Eyes - rabbit Result: Corrosive to eyes

Sensitization: No additional information.
Numerical Measures: No additional information.
Carcinogenicity: No additional information.
Mutagenicity: No additional information.
Reproductive Toxicity: No additional information.

SECTION 12: Ecological information

Ecotoxicity:

7647-01-0: Toxicity to fish LC50 - Gambusia affinis (Mosquito fish) - 282 mg/l - 96 h (Hydrochloric acid)

Persistence and degradability: No additional information.
Bioaccumulative potential: No additional information.
Mobility in soil: No additional information.
Other adverse effects: No additional information.

SECTION 13: Disposal considerations

Waste disposal recommendations:

Do not allow product to reach sewage system or open water. It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Contact a licensed professional waste disposal service to dispose of this material. Dispose of empty containers as unused product. Product or containers must not be disposed together with household garbage. 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. Ensure complete and accurate classification.

SECTION 14: Transport information

US DOT

UN Number:
ADR, ADN, DOT, IMDG, IATA 1789

Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: HYDROCHLORIC ACID.
Hazard Class: 8
Packing Group: II.
Marine Pollutant (if applicable): No additional information.
Comments: None

Non Bulk:
RQ (if applicable): None
Proper shipping Name: HYDROCHLORIC ACID.
Hazard Class: 8
Packing Group: II.
Marine Pollutant (if applicable): No additional information.
Comments: None


SECTION 15: Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

Acute

SARA Section 313 (Specific toxic chemical listings):

7647-01-0 Hydrochloric Acid.

RCRA (hazardous waste code):

None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

7647-01-0 Hydrochloric Acid 5000 lbs.

Proposition 65 (California):

Chemicals known to cause cancer:

None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females:

None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males:

None of the ingredients are listed.

Chemicals known to cause developmental toxicity:

None of the ingredients are listed.

Canada

Canadian Domestic Substances List (DSL):

All ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 1%):

7647-01-0 Hydrochloric Acid.

SECTION 16: Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations. Note. The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases: None

Abbreviations and Acronyms:

IMDG International Maritime Code for Dangerous Goods.
PNEC Predicted No-Effect Concentration (REACH).
CFR Code of Federal Regulations (USA).
SARA Superfund Amendments and Reauthorization Act (USA).
RCRA Resource Conservation and Recovery Act (USA).
TSCA Toxic Substances Control Act (USA).
NPRI National Pollutant Release Inventory (Canada).
DOT US Department of Transportation.
IATA International Air Transport Association.
GHS Globally Harmonized System of Classification and Labelling of Chemicals.
ACGIH American Conference of Governmental Industrial Hygienists.
CAS Chemical Abstracts Service (division of the American Chemical Society).
NFPA National Fire Protection Association (USA).
HMIS Hazardous Materials Identification System (USA).
WHMIS Workplace Hazardous Materials Information System (Canada).
DNEL Derived No-Effect Level (REACH).

Effective date: 01.08.2015
Last updated: 05.28.2015

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

1 Identification

· **Product Identifier**

· **Trade Name: Precision Calibration Gas Mixture**
· **Product Number:** G-1315
· **Relevant identified uses of the substance or mixture and uses advised against:**
Used for calibration of gas measuring devices. Not suitable for human consumption.
· **Product Description:**
Calibration gas mixture consisting of Carbon Monoxide, Hydrogen Sulfide, Methane, Oxygen and Nitrogen.
· **Application of the substance / the mixture:** Pressurized gas, requires appropriate regulator to dispense.

· **Details of the Supplier of the Safety Data Sheet:**
· **Manufacturer/Supplier:**
Gasco Affiliates, LLC
320 Scarlett Blvd.
Oldsmar, Fl 34677

TELEPHONE NUMBER: (800) 910-0051
FAX NUMBER: (866) 755-8920
E-MAIL: info@gascogas.com
· **Emergency telephone number:**
Inside the US: 1-833-723-3267 (CHEMTREC, 24 hours)
Outside the US: 1-703-527-3887 (CHEMTREC, 24 hours)

2 Hazard(s) Identification

· **Classification of the substance or mixture:**


Gas cylinder

Press. Gas H280 Contains gas under pressure; may explode if heated.

Acute Tox. 4 H332 Harmful if inhaled.

Simple Asphyxiant May displace oxygen and cause rapid suffocation.

· **Label elements:**
· **Hazard pictograms:**

· **Signal word:** Warning

· **Hazard-determining components of labeling:**
Carbon Monoxide
· **Hazard statements:**
H280 Contains gas under pressure; may explode if heated.
H332 Harmful if inhaled.
May displace oxygen and cause rapid suffocation.
· **Precautionary statements:**
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P271 Use only outdoors or in a well-ventilated area.

(Contd. on page 2)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a poison center/doctor if you feel unwell.
P410+P403 Protect from sunlight. Store in a well-ventilated place.

· ***Unknown acute toxicity:***
99.5 % of the mixture consists of component(s) of unknown toxicity.
· ***Classification system:***
· ***NFPA ratings (scale 0 - 4)***

Health = 0
Fire = 1
Reactivity = 0

· ***HMIS-ratings (scale 0 - 4)***

Health = 0
Fire = 1
Physical Hazard = 0

· ***Hazard(s) not otherwise classified (HNOC):*** None known

3 Composition/Information on Ingredients

· ***Chemical characterization: Substance***
· ***Description:*** Mixture of substances listed below with non-hazardous additions.

· ***Dangerous Components:***		
CAS: 7727-37-9 RTECS: QW 9700000	Nitrogen Press. Gas, H280; Simple Asphyxiant	75.3901 - 91.799%
CAS: 7782-44-7	Oxygen Oxid. Gas 1, H270; Press. Gas, H280	8 - 21%
CAS: 74-82-8 RTECS: PA 1490000	Methane Flam. Gas 1, H220; Press. Gas, H280; Simple Asphyxiant	0.1 - 3.0%
CAS: 630-08-0 RTECS: FG 3500000	Carbon Monoxide Flam. Gas 1, H220; Press. Gas, H280; Acute Tox. 3, H331; Repr. 1A, H360; STOT RE 1, H372	0.0005-0.15%
CAS: 7783-06-4	Hydrogen Sulfide Flam. Gas 1, H220; Press. Gas, H280; Acute Tox. 2, H330; Aquatic Acute 1, H400	0.0005 - 0.01%

*

4 First-Aid Measures

· ***Description of first aid measures***
· ***After inhalation:***
Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist.
In case of unconsciousness place patient stably in the side position for transportation.
· ***After skin contact:*** Generally, the product does not irritate the skin.
· ***After eye contact:*** Not anticipated under normal use.
· ***After swallowing:*** Not a normal route of entry.
· ***Information for doctor***
· ***Most important symptoms and effects, both acute and delayed:*** No further relevant information available.
· ***Indication of any immediate medical attention and special treatment needed:***
No further relevant information available.

(Contd. on page 3)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

5 Fire-Fighting Measures

· ***Extinguishing media***
· ***Suitable extinguishing agents:*** Use fire fighting measures that suit the environment.
· ***For safety reasons unsuitable extinguishing agents:*** No further relevant information.
· ***Special hazards arising from the substance or mixture:***
If incinerated, product will release the following toxic fumes: Oxides of Carbon, Nitrogen (NOx) and Sulfur.
· ***Advice for firefighters***
This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire. Firefighters should be aware of the presence of Hydrogen Sulfide in this gas mixture, which can cause significant health effects.
· ***Special protective equipment for firefighters:***
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear to prevent contact with skin and eyes.

6 Accidental Release Measures

· ***Personal precautions, protective equipment and emergency procedures:***
Ensure adequate ventilation.
Keep people at a distance and stay upwind.
· ***Environmental precautions:*** Inform authorities in case of gas release.
· ***Methods and material for containment and cleaning up:***
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Dispose of the collected material according to regulations.
· ***Reference to other sections:***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

* 7 Handling and Storage

· ***Handling***
· ***Precautions for safe handling:***
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms due to the potential for oxygen deficiency (simple asphyxiation). Do not attempt to adjust, repain or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.
· ***Information about protection against explosions and fires:***
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C, i.e. electric lights. Do not pierce or burn, even after use.
Keep protective respiratory device available.
Do not spray on a naked flame or any incandescent material.

· ***Conditions for safe storage, including any incompatibilities***
Store away from strong oxidizing agents, strong bases, phosphorous, organic materials and powdered metals.
· ***Storage***
· ***Requirements to be met by storerooms and receptacles:***
Store in a cool location.
CylinDers should be firmly secured to prevent falling or being knocked over. Cylinders must be protected from the environment, and preferably kept at room temperature. Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a "first-in, first-out" inventory system to prevent full containers

(Contd. on page 4)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

freom being stored for long periods of time.
· ***Information about storage in one common storage facility:*** Not required.
· ***Further information about storage conditions:*** Store in cool, dry conditions in well sealed receptacles.
· ***Specific end use(s):*** No further relevant information available.

*
8 Exposure Controls/Personal Protection

· ***Additional information about design of technical systems:*** No further data; see section 7.

· ***Control parameters:***
All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use local exhaust at filling zones and where leakage and dust formation is probable. Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure Limits in Air below TLV & PEL limits.
· ***Components with occupational exposure limits:***
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
At this time, the remaining constituents have no known exposure limits.

7727-37-9 Nitrogen	
TLV	withdrawn TLV, see App. F; simple asphyxiant
74-82-8 Methane	
TLV	refer to Appendix F, 1000ppm
630-08-0 Carbon Monoxide	
PEL	Long-term value: 55 mg/m³, 50 ppm
REL	Long-term value: 40 mg/m³, 35 ppm Ceiling limit value: 229 mg/m³, 200 ppm
TLV	Long-term value: 29 mg/m³, 25 ppm BEI
7783-06-4 Hydrogen Sulfide	
PEL	Ceiling limit value: 20; 50* ppm *10-min peak; once per 8-hr shift
REL	Ceiling limit value: 15* mg/m³, 10* ppm *10-min
TLV	Short-term value: 7 mg/m³, 5 ppm Long-term value: 1.4 mg/m³, 1 ppm

· ***Ingredients with biological limit values:***	
630-08-0 Carbon Monoxide	
BEI	3.5 % of hemoglobin blood end of shift Carboxyhemoglobin (background, nonspecific) 20 ppm end-exhaled air end of shift Carbon monoxide (background, nonspecific)

· ***Additional information:*** The lists that were valid during the creation of this SDS were used as basis.

· ***Exposure controls:***
· ***Personal protective equipment***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.

(Contd. on page 5)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

Immediately remove all soiled and contaminated clothing and wash before reuse.
Wash hands before breaks and at the end of work.
Store protective clothing separately.

· **Breathing equipment:**

Suitable respiratory protective device recommended.

· **Protection of hands:** Not required.
· **Material of gloves:** Not applicable.
· **Penetration time of glove material:** Not applicable.

*

9 Physical and Chemical Properties

· **Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Gaseous
Color:	Clear, colorless
· **Odor:**	Rotten
· **Odor threshold:**	Not determined.
· **pH-value:**	Not available
· **Change in condition**	
Melting point/Melting range:	Not determined.
· **Flash point:**	None
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not self-igniting.
· **Danger of explosion:**	Not determined.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not determined.
· **Density:**	
Relative density:	Not determined.
Vapor density:	Not determined.
Evaporation rate:	Not applicable.
· **Solubility in / Miscibility with:**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	0.0 %

(Contd. on page 6)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

· **Other information:** No further relevant information available.

10 Stability and Reactivity

· **Reactivity:** No further relevant information available.
· **Chemical stability:** Stable under normal conditions.
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions:** No dangerous reactions known.
· **Conditions to avoid:** No further relevant information available.
· **Incompatible materials:**
Strong oxidizing agents, strong bases, phosphorous, organic materials and powdered metals.
· **Hazardous decomposition products:** Oxides of Carbon, Nitrogen (NOx) and Sulfur.

11 Toxicological Information

· **Information on toxicological effects:**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
630-08-0 Carbon Monoxide		
Inhalative	LC50/4 h	7520 mg/l (Rat)
7783-06-4 Hydrogen Sulfide		
Inhalative	LC50/4 h	634 mg/l (Mouse)
		444 mg/l (Rat)
	LC50/96 hours	0.016 mg/l (Pimephales)
74-82-8 Methane		
Inhalative	LC50/4 h	217 mg/l (Mouse)

· **Primary irritant effect:**
· **On the skin:** No irritating effect.
· **On the eye:** No irritating effect.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:

· **Carcinogenic categories:**
· **IARC (International Agency for Research on Cancer):**
Group 1 - Carcinogenic to humans
Group 2A - Probably carcinogenic to humans
Group 2B - Possibly carcinogenic to humans
Group 3 - Not classifiable as to its carcinogenicity to humans
Group 4 - Probably not carcinogenic to humans

None of the ingredients are listed.

· **NTP (National Toxicology Program):**
None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration):**
None of the ingredients are listed.

12 Ecological Information

· **Toxicity:**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability:** No further relevant information available.

(Contd. on page 7)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

· ***Behavior in environmental systems:***
· ***Bioaccumulative potential:*** No further relevant information available.
· ***Mobility in soil:*** No further relevant information available.
· ***Additional ecological information:***
· ***General notes:*** Generally not hazardous for water.
· ***Results of PBT and vPvB assessment:***
· ***PBT:*** Not applicable.
· ***vPvB:*** Not applicable.
· ***Other adverse effects:*** No further relevant information available.

13 Disposal Considerations

· ***Waste treatment methods***
· ***Recommendation:***
Release all residual gas pressure in a well ventilated area. Verify the cylinder is completely empty (0 PSIG). Remove or cover any hazard labels. Return empty supplier for recycling.
NOTE: Check with the local waste authority before placing any gas cylinder into a waste container for pickup. GASCO encourages the consumer to return all cylinders.
· ***Waste disposal key:*** The U.S. EPA has not published waste numbers for this product's components.

· ***Uncleaned packaging***
· ***Recommendation:*** Return cylinder and unused product to supplier.

* 14 Transport Information

· ***UN-Number:***
· ***DOT, ADR/ADN, IMDG, IATA*** UN1956
· ***UN proper shipping name:***
· ***DOT*** Compressed gas, n.o.s.
· ***ADR/ADN*** UN1956 Compressed gas, n.o.s.
· ***IMDG, IATA*** UN1956 COMPRESSED GAS, N.O.S.
· ***Transport hazard class(es):***

· ***DOT***

· ***Class:*** 2.2
· ***Label:*** 2.2

· ***ADR/ADN***

· ***Class:*** 2.2 1A
· ***Label:*** 2.2

(Contd. on page 8)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

· **IMDG, IATA**

· **Class:**	2.2
· **Label:**	2.2
· **Packing group:**	-
· **Environmental hazards:**	Not applicable.
· **Special precautions for user:**	Not applicable.
· **Hazard identification number (Kemler code):**	20
· **EMS Number:**	F-C,S-V
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:**	Not applicable.

· **Transport/Additional information:**

· **DOT**

· **Quantity limitations:**	On passenger aircraft/rail: 75 kg On cargo aircraft only: 150 kg

· **ADR/ADN**

· **Excepted quantities (EQ):**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN1956, Compressed gas, n.o.s., 2.2

15 Regulatory Information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture:**
No further relevant information available.

· **SARA (Superfund Amendments and Reauthorization):**

· **Section 355 (extremely hazardous substances):**

7783-06-4	Hydrogen Sulfide

· **Section 313 (Specific toxic chemical listings):**

7783-06-4	Hydrogen Sulfide

· **TSCA (Toxic Substances Control Act):**

7727-37-9	Nitrogen
7782-44-7	Oxygen
74-82-8	Methane
630-08-0	Carbon Monoxide
7783-06-4	Hydrogen Sulfide

· **California Proposition 65:**

· **Chemicals known to cause cancer:**

None of the ingredients are listed.

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

(Contd. on page 9)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

· **Chemicals known to cause developmental toxicity:**

630-08-0	Carbon Monoxide

· **New Jersey Right-to-Know List:**

All ingredients are listed.

· **New Jersey Special Hazardous Substance List:**

74-82-8	Methane	F4
630-08-0	Carbon Monoxide	TE, F4
7783-06-4	Hydrogen Sulfide	F4

· **Pennsylvania Right-to-Know List:**

All ingredients are listed.

· **Pennsylvania Special Hazardous Substance List:**

630-08-0	Carbon Monoxide	E
7783-06-4	Hydrogen Sulfide	E

· **Carcinogenic categories:**

· **EPA (Environmental Protection Agency):**

7783-06-4	Hydrogen Sulfide	I

· **TLV (Threshold Limit Value established by ACGIH):**

None of the ingredients are listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health):**

None of the ingredients are listed.

· **GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms:**

· **Signal word:** Warning

· **Hazard-determining components of labeling:**

Carbon Monoxide

· **Hazard statements:**

H280 Contains gas under pressure; may explode if heated.
H332 Harmful if inhaled.
May displace oxygen and cause rapid suffocation.

· **Precautionary statements:**

P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P271 Use only outdoors or in a well-ventilated area.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a poison center/doctor if you feel unwell.
P410+P403 Protect from sunlight. Store in a well-ventilated place.

· **National regulations:**

None of the ingredients are listed.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

(Contd. on page 10)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 03/28/2021 Reviewed on 03/28/2021

Trade Name: Precision Calibration Gas Mixture

16 Other Information

· ***Relevant phrases:***
Gasco Affiliates, LLC, makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Gasco Affiliates, LLC shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.
· ***Contact:***
· ***Date of last revision/ revision number:*** 03/28/2021 / -
· ***Abbreviations and acronyms:***
ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety & Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit
Flam. Gas 1: Flammable gases – Category 1
Oxid. Gas 1: Oxidizing gases – Category 1
Press. Gas: Gases under pressure – Compressed gas
Press. Gas: Gases under pressure – Dissolved gas
Acute Tox. 2: Acute toxicity – Category 2
Acute Tox. 3: Acute toxicity – Category 3
Acute Tox. 4: Acute toxicity – Category 4
Repr. 1A: Reproductive toxicity – Category 1A
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
· **** Data compared to the previous version altered.***
SDS created by MSDS Authoring Services www.msdsauthoring.com +1-877-204-9106

SAFETY DATA SHEET

Isobutylene

Section 1. Identification

GHS product identifier : Isobutylene

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

SDS # : 001031

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product code : 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	**ACGIH TLV (United States, 3/2017).** TWA: 250 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : -140.7°C (-221.3°F)

Boiling point : -6.9°C (19.6°F)

Critical temperature : 144.75°C (292.6°F)

Flash point : Closed cup: -76.1°C (-105°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 9.6%

Vapor pressure : 24.3 (psig)

Vapor density : 1.94 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.6845

Gas Density (lb/ft ^{3}) : 0.1496 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.26 g/l

Partition coefficient: n-octanol/water : 2.34

Auto-ignition temperature : 465°C (869°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 56.12 g/mole

Aerosol product

Heat of combustion : -45029034 J/kg

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 19, T50

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Ship Index Forbidden
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Thailand : Not determined.

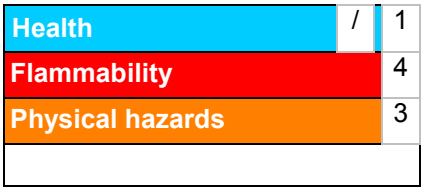
Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas	Expert judgment Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of revision : 5/10/2018

Date of previous issue : 7/11/2016

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Nonflammable Gas Mixture: Helium 99.9-99.9999% / Water 1-1000ppm

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier : Nonflammable Gas Mixture: Helium 99.9-99.9999% / Water 1-1000ppm

Other means of identification : Not available.

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

SDS # : 011710

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

Product code : 011710

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
Helium	99.9 - 99.9999	7440-59-7
WATER	0.0001 - 0.1	7732-18-5

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	**ACGIH TLV (United States, 3/2017). Oxygen Depletion [Asphyxiant].**
WATER	None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Melting point : -272.2°C (-458°F) This is based on data for the following ingredient: helium.

Boiling point : Not available.

Critical temperature : Lowest known value: -267.9°C (-450.2°F) (helium).

Flash point : Not available.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Highest known value: 0.14 (Air = 1) (helium).

Gas Density (lb/ft ^{3}) : Only known value: 0.0104 (helium).

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Section 11. Toxicological information

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Helium	0.28	-	low
WATER	-1.38	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1956	UN1956	UN1956	UN1956	UN1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (helium, water)	COMPRESSED GAS, N.O.S. (helium, water)	COMPRESSED GAS, N.O.S. (helium, water)	COMPRESSED GAS, N.O.S. (helium, water)	COMPRESSED GAS, N.O.S. (helium, water)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
Passenger Carrying Road or Rail Index 75

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

Section 15. Regulatory information

State regulations

Massachusetts : The following components are listed: HELIUM

New York : None of the components are listed.

New Jersey : The following components are listed: HELIUM

Pennsylvania : The following components are listed: HELIUM

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan : **Japan inventory (ENCS)**: Not determined.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : All components are listed or exempted.

Thailand : Not determined.

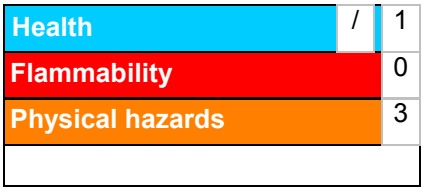
Turkey : Not determined.

United States : All components are listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



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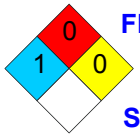
National Fire Protection Association (U.S.A.)

Section 16. Other information



Flammability

Health

Instability/Reactivity

Special

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
GASES UNDER PRESSURE - Compressed gas	On basis of test data

History

Date of printing : 8/5/2018

Date of issue/Date of revision : 8/5/2018

Date of previous issue : 9/29/2016

Version : 2

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
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LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
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APPENDIX C

Incident Investigation and Reporting Program

INCIDENT INVESTIGATION AND REPORTING MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/19**
REVISION NUMBER	:	**4**

TABLE OF CONTENTS

APPENDICES

Appendix A – Accident Report and Investigation Form

Appendix B – Near Loss Form

Appendix C – Injury Illness Reporting Flow Chart

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has instituted the following management program for reporting Environmental Health and Safety (EHS) incidents and near losses, investigation and correcting the causes of incidents, tracking incidents and corrective actions taken, and sharing the cause and corrective actions with Roux personnel. These practices and procedures establish a method to track progress and improvements to the company EHS performance.

2. SCOPE AND APPLICABILITY

These procedures apply to all Roux employees. Employees are required to follow these procedures for all incidents involving Roux personnel, or other personnel (e.g., subcontractors) working for Roux, regardless of the specific work activity or work location.

This program is intended, in part, to fulfill the Occupational Safety and Health Administration (OSHA) occupational injury and illness reporting and recording requirements cited in the Code of Federal Regulations (CFR) at 29 CFR 1904.

3. RESPONSIBILITIES

It shall be the responsibility of all Roux employees to report all incidents as soon as possible to the PM (or Administrative Manager for office-related incidents), SHSO, OHSM and OM, regardless of severity. Additionally, the following positions have specific responsibilities for implementing this specific SOP.

3.1 Corporate Health and Safety Manager (CHSM)

- The CHSM has the responsibility of ensuring that a system is in place for reporting, investigation, correction, and communicating of EHS incidents and near losses.
- The CHSM has the overall responsibility of implementing and communicating the contents of this program to Office Health and Safety Managers (OHSMs).
- The CHSM will review all incidents and corrective actions taken. The CHSM will provide a summary of serious incidents to the Board of Directors.
- The CHSM will communicate learnings from incidents and corrective actions taken to all personnel, through quarterly communications.
- The CHSM will periodically review and evaluate the effectiveness of this procedure.

3.2 Office Manager (OM)

- The OM will designate the individual to serve as the OHSM responsibility for ensuring that requirements in this procedure are met.
- The OM will ensure that sufficient resources are allocated to fulfill the requirements of this procedure.
- The OM will conduct final review of all incident reports prepared under this procedure.

3.3 Office Health and Safety Manager (OHSM)

- It is the responsibility of the OHSM to review draft incident reports and assist the OM in finalizing reports of all accidents, illnesses and incidents related to work activity, and to assist the SHSO when necessary.

- The OHSM may not approve a site-specific HASP unless the HASP includes incident reporting procedures and forms.
- The OHSM will suggest and implement corrective actions to prevent the same type of incident from re-occurring.
- The OHSM will keep all incident reports, corrective action taken, and follow-up forms on file. The OHSM will provide copies of all final reports and forms to the CHSM within one week of the incident. If a serious incident occurs, the CHSM will be notified as soon as possible.
- The occurrence of a serious incident will trigger an EHS audit by the OHSM.

3.4 Project Manager (PM)

- It shall be the PM's responsibility to promptly correct any deficiencies that were determined to cause or contribute to the incident investigated.
- If a site-specific HASP is not utilized, the PM must ensure that field personnel have copies of the Roux Accident Reporting and Investigation Forms.
- The PM has the responsibility of ensuring that the SHSO and other field personnel understand the need for timely incident reporting.
- In the event of an incident, the PM will determine the root cause of the incident with the assistance of the SHSO and/or OHSM. The PM should provide input as to corrective preventative measures.

3.5 Site Health and Safety Officer (SHSO)

- The SHSO shall provide the details of the incident to the OHSM, PM and OM. The OM or his delegate will provide additional notifications, such as, in the event of a work-related motor vehicle accident, to include Roux Legal.
- It is the SHSO's responsibility to immediately notify the OHSM and the PM when any incident occurs. Such notification should take place immediately following the completion of any emergency actions required by the HASP.
- The SHSO should provide input as to corrective preventative measures.
- The SHSO must ensure that corrective actions proposed by the OHSM or OM are carried out.

3.6 All Personnel

- All personnel are responsible for reporting and describing the details of any incident in which they are involved to the SHSO and PM. Such notification should take place immediately following the completion of any emergency actions required by the HASP and after the loss and before the scene is disturbed or vehicles moved.

4. PROCEDURE

4.1 Incident Investigation

On receiving a report of incident or near loss occurrence from a Roux employee, the SHSO or OHSM shall immediately investigate the circumstances and shall make appropriate recommendations to prevent recurrence. The Incident Report form can be found in **Appendix A**, and Near Loss form can be found in **Appendix B**. The OHSM may participate in the investigation of more serious accidents and incidents that occur on-site. The Corporate Health and Safety Manager (CHSM) shall also be immediately notified by telephone on occurrence of a serious accident or incident. At the CHSM's discretion, he may also participate in the investigation.

4.2 Incident Report

Details of the incident shall be documented using the Accident Report and Investigation Forms (Appendix A) within twenty-four (24) hours of the incident and shall be distributed to the SHSO, the OHSM, PM, OM and the CHSM. The CHSM will update OSHA Forms 301 and the 300 log when necessary.

Appendix A – Accident Report and Investigation Form

☐ Roux Environmental Engineering and Geology, D.P.C.
☐ Roux Associates, Inc. ☐ Remedial Engineering, P.C.

ACCIDENT REPORT

Brian Hobbs, Corporate Health and Safety Manager
Cell: (631) 807-0193; Office: (631) 630-2416

PART 1: ADMINISTRATIVE INFORMATION

Project #: _____
Project Name: _____
Project Location (street address/city/state)**:**
_____
_____
Client Corporate Name / Contact / Address / Phone #:
_____
_____
_____
_____
_____

Immediate Verbal Notifications Given To:

Corporate Health & Safety	☐Yes	☐No
Office Health & Safety	☐Yes	☐No
Office Manager	☐Yes	☐No
Project Principal	☐Yes	☐No
Project Manager	☐Yes	☐No
Client Contact	☐Yes	☐No

REPORT STATUS (time due):
☐ Initial (24 hr) Date: _____
☐ Final (5-10 days) Date: _____

Accident Report Delivered To:

Corporate Health & Safety	☐Yes	☐No
Office Health & Safety	☐Yes	☐No
Office Manager	☐Yes	☐No
Project Principal	☐Yes	☐No
Project Manager	☐Yes	☐No

REPORT TYPE: ☐ Loss ☐ Near Loss Estimated Costs: $ _____

OSHA CASE # Assigned by Corporate Health & Safety if Applicable:

Corporate Health & Safety Confirmed Final Accident Report ☐Yes ☐No

DATE OF INCIDENT: _____

TIME INCIDENT OCCURRED: _____ ☐AM ☐PM

INCIDENT LOCATION – City, State, and Country (If outside U.S.A.) _____

INCIDENT TYPES: (Select most appropriate if Loss occurred.)
From lists below, please select the option that best categories the incident. When selecting an injury or illness, also indicate the severity level.

☐**INJURY** ☐**ILLNESS**

----------**Severity Level**----------

☐Fatality ☐First Aid ☐Medical Treatment
☐Restricted Work ☐Lost Time

OTHER INCIDENT TYPES

☐Spill / Release
Material involved: _____
Quantity (U.S. Gallons): _____

☐Misdirected Waste ☐Consent Order ☐NOV
☐Property Damage ☐Exceedance
☐Motor Vehicle ☐Fine / Penalty

ACTIVITY TYPE (Check most appropriate one.)

☐CAMP	☐Gauging	☐Subsurface Clearance
☐Construction	☐O&M	☐Trucking
☐Drilling	☐Other Soil Work (e.g. Compaction)	☐Waste Mgmt.
☐Driving	☐Sampling	☐Work Area Prep.
☐Excavation / Trenching	☐Site Walk/Inspection	☐Other

INJURY TYPE (Check all applicable.)

☐Abrasion	☐Occupational Illness
☐Amputation	☐Puncture
☐Burn	☐Rash
☐Cold/Heat Stress	☐Repetitive Motion
☐Inflammation	☐Sprain/Strain
☐Laceration	☐Other_____

BODY PART AFFECTED (Check all applicable.)

☐Respiratory	☐Shoulder	☐Face
☐Neck	☐Arm	☐Leg
☐Chest	☐Wrist	☐Knee
☐Abdomen	☐Hand/Fingers	☐Ankle
☐Groin	☐Eye	☐Foot/Toes
☐Back	☐Head	☐Other_____

I. PERSON(S) DIRECTLY / INDIRECTLY INVOLVED IN INCIDENT (Attach additional information as necessary/applicable.)

Name/Phone # of Each Person Directly/Indirectly Involved in Incident:	Designate: Roux/Remedial Employee Roux/Remedial Subcontractor Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:
1)				
2)				

II. PERSONS INJURED IN INCIDENT (Attach additional information as necessary/applicable.)

Name/Phone # of Each Person Injured in Incident:	Designate: Roux/Remedial Employee Roux/Remedial Subcontractor Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:	Description of Injury:
1)					
2)					

III. PROPERTY DAMAGED IN INCIDENT (Attach additional information as necessary/applicable.)

Property Damaged:	Property Location:	Owner Name, Address & Phone #:	Description of Damage:	Estimated Cost:
1)				
2)				$

IV. WITNESSES TO INCIDENT (Attach additional information as necessary/applicable.)

Witness Name:	Address:	Phone #:
1)		
2)		

PART 2: WHAT HAPPENED AND INCIDENT DETAILS

PROVIDE FACTUAL DESCRIPTION OF INCIDENT (e.g., describe loss/near loss, injury, response / treatment).

I. AUTHORITIES/GOVERNMENTAL AGENCIES NOTIFIED (Attach additional information as necessary/applicable.)

Authority/Agency Notified:	Name/Phone #/Fax # of Person Notified:	Address of Person Notified:	Date & Time of Notification:	Exact Information Reported/Provided:

II. PUBLIC RESPONSES TO INCIDENT (if applicable)

Response/Inquiry By: (check one)	Entity Name:	Name/Phone # of Respondent/ Inquirer:	Address of Entity/Person:	Date & Time of Response/Inquiry:
☐Newspaper ☐Television ☐Community Group ☐Neighbors ☐Other _____				

Describe Response/Inquiry:

Roux/Remedial Response:

(Check all that apply.) (Attach photos, drawings, etc. to help illustrate the incident.)
ATTACHED INFORMATION: ☐Photo ☐Sketches ☐Vehicle Acord Form ☐Police Report ☐Other

Name(s) of person(s) who prepared Initial and Final Report:	**Title(s):**	**Phone number(s):**

PART 3: INVESTIGATION TEAM ANALYSIS

Date Investigation Started (MM/DD/YYYY):

Factors, Root Causes, and Solution (FRCS): Complete FRCS form and answer all 7 factor questions. If answering NO to Factors 1 – 4 identify root cause(s) and explain why QIs) occurred. If answering YES to Factors 5 – 7 circle the root cause(s). Transfer the solutions guidance that addresses each root cause from the FRCS form to this form. Attach your completed FRCS Worksheet. If Factors 1-7 do not apply to the incident, write "External Cause" in the Factor column below and leave the remaining fields blank.

DESCRIPTION OF UNDESIRABLE BEHAVIOR/CONDITION

1.

2.

FACTOR(S) AND SOLUTION(S): HOW TO REDUCE POSSIBILITY OF INCIDENT RECURRING
Selection of factors and solutions reflects the analysis of investigation team and is not meant to be a legally binding conclusion as to the Root Cause and/or solution.

CAUSAL FACTOR/ BEHAVIOR/ CONDITION	ROOT CAUSE	SOLUTION(S) [Must Match Root Cause(s)]	PERSON RESPONSIBLE	AGREED DUE DATE	ACTUAL COMPLETION DATE

INVESTIGATION TEAM:

PRINT NAME	JOB POSITION	DATE	SIGNATURE

QUALITY REVIEW Correct root cause(s) identified? Do root cause(s) and solution(s) match? Are solution(s) feasible / maintainable?

Name: **Job Title:**

PART 4: Date Solutions were Implemented & Validated (Were Solutions Effective?)

Date	Solution	Verifier / Validator Name and Job Title	**Details** (of I & V performed)

Appendix B – Near Loss Form

HEALTH & SAFETY NEAR LOSS
ROUX REPORT FORM

☐ **Roux Environmental Engineering and Geology, D.P.C.**
☐ **Roux Associates, Inc.** ☐ **Remedial Engineering, P.C.**

(Check applicable company name)

PART 1: ADMINISTRATIVE INFORMATION

Office: ☐ New York ☐ Massachusetts ☐ New Jersey ☐ Illinois ☐ CA - Los Angeles ☐ CA - Oakland

Project Manager:	**Project Principal:**
Project Name:	**Project Location:**

PART 2: NEAR LOSS INCIDENT DETAILS

Date\Time Occurred (MM/DD/YYYY HH:MM)**:**	**Date\Time Submitted** (MM/DD/YYYY HH:MM)**:**

NEAR LOSS INCIDENT TYPE - What could have happened? - Select all that apply (1-7)

1. ☐ Fire / Explosion
2. ☐ Injury / Illness
3. ☐ Security (e.g., theft, trespassing, vandalism)
4. ☐ Environmental (Spill, permit exceedance, etc.)
5. ☐ Transportation of personnel (vehicle accident)
6. ☐ Property/Equipment Damage
7. ☐ Business Interruption

Event Leading to Potential Injury/Illness:

Job Task*:	**Equipment Involved*:**

WHAT HAPPENED? Do not include individuals' names. Ensure photos, sketches, etc. are not personally identifiable unless written consent has been obtained.

Summary (1-2 sentences. Provide brief description of the incident. Provide facts only, no speculation or opinion)**:**

Incident Details (Brief factual details of what, where, when; include photos, sketches, etc. as attachments)**:**

Immediate Corrective Actions Taken:

SERIOUS INJURY OR FATALITY (SIF): IF AN ACTUAL SIF, USE EXISTING ROUX ACCIDENT REPORTING FORM

Could this have resulted in a SIF? ☐ **Yes** ☐ **No**

A potential SIF is defined as likely to have caused an injury resulting in significant physical body damage with probable long term and/or life altering complications.

INCIDENT INVOLVED:

Roux Employee: ☐ **Yes** ☐ **No** **Subcontractor Company Name:**

INVESTIGATION TEAM

NAME	JOB TITLE	NAME	JOB TITLE

PART 3: INCIDENT INVESTIGATION FINDINGS AND REPORT QUALITY REVIEW

Date Investigation Started (mm/dd/yyyy):

Factors, Root Causes, and Solution (FRCS): Complete FRCS form and answer all 7 factor questions. If answering NO to Factors 1 – 4 identify root cause(s) and explain why QIs) occurred. If answering YES to Factors 5 – 7 circle the root cause(s). Transfer the solutions guidance that addresses each root cause from the FRCS form to this form. Attach your completed FRCS Worksheet. If Factors 1-7 do not apply to the incident, write "External Cause" in the Factor column below and leave the remaining fields blank. Do not include individuals' names.

DESCRIPTION OF UNDESIRABLE BEHAVIOR/CONDITION

1.

2.

FACTOR(S) AND SOLUTION(S): HOW TO REDUCE POSSIBILITY OF INCIDENT RECURRING
Selection of factors and solutions reflects the analysis of investigation team and is not meant to be a legally binding conclusion as to the Root Cause and/or solution.

Behavior / Condition	Root Cause	Solution(s) (Must Match Root Cause)	Person Responsible for Completion	Completion Target Date	Completion Actual Date

QUALITY REVIEW Correct root cause(s) identified? Do root cause(s) and solution(s) match? Are solution(s) feasible / maintainable?

Name: **Job Title:**

PART 4: Date Solutions were Implemented & Validated (Were Solutions Effective?)

Date	Solution	Verifier / Validator Name and Job Title	**Details** (of I & V performed)

***JOB TASK - Select the most appropriate one** (primary job associated with incident-related work activity, avoid "Other" if possible)

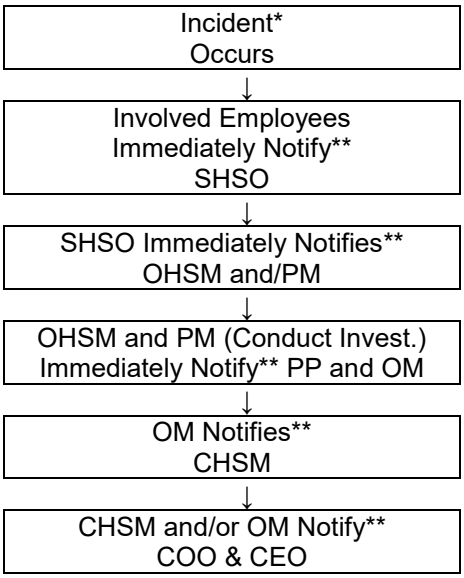
1. CAMP
2. Construction
3. Drilling
4. Driving
5. Excavation/Trenching
6. Gauging
7. O&M
8. Other Soil Work (e.g. Compaction)
9. Sampling
10. Site Walk/ Inspection
11. Subsurface Clearance
12. Trucking
13. Waste Management
14. Work Area Preparation
15. Other

***EQUIPMENT INVOLVED THAT CONTRIBUTED TO H&S NEAR LOSS - Select all that apply**

1. Air Stripper
2. API Separator
3. Automobile
4. Boom Material
5. Bulldozer
6. Cable
7. Carbon Drum / Vessel
8. Chain Block
9. Compressor, Air
10. Control Panel (local)
11. Crane (mobile)
12. Drill Rig
13. Drilling Equipment, Vacuum
14. Drum, Vertical
15. Dump Truck
16. Electric Heater
17. Electrical Power Supply
18. Engine, Combustion
19. Equipment Safety Grounding
20. Excavator / Power Shovel
21. Exclusion Zone Equipment
22 Fan / Blower
23 Fencing
24 Filter
25. Fire Extinguisher
26. Forklift
27. Front End Loader
28. Grader
29. Hammer
30. Knife
31. Non-Powered Equipment
32. Powered Equipment
33. Drill
34. Grinder
35. Hydraulic Torque Wrench
36. Powered Saw
37. Impact Wrench
38. Saw
39. Screwdriver
40. Shears
41. Shovel
42. Snip
43. Wrench
44. Hoist
45, Hook/Clamp/Buckle, etc.
46. Jack
47. Ladder, Extension
48. Ladder, Platform
49. Ladder, Step
50. Lock Out / Tag Out
51. Maintenance Tool, General
52. Manifold
53, Manlift/Basket/Cherry Picker
54. Motor, Electric
55. Oxidizer
56. Pallet
57. Piping
58. Piping, Hose
59. Piping, Injection/Mixing Point
60. Hydrojet
61. Centrifugal Pump
62. Diaphragm Pump
63. Reciprocating Pump
64. Regenerative Pump
65. Rotary Pump
66. Transfer Pump
67. Submersible Pump
68. Face Shield
69. Fall Protection
70. Gloves
71. Hard Hat / Helmet
72. Hearing Protection
73. Respiratory PPE (Chemical)
74. Respiratory PPE (Particulate)
75. Safety Glasses
76. Safety Goggles
77. Safety Shoes / Boots
78. Safety Vest / Clothing
79. Rope
80. Bailer
81. Geoprobe
82. Hand Auger
83. PID
84. Multi-Gas Meter
85. Sample Container
86. Split-Spoon Sampler
87. Sling
88. Snow Blower
89. Snow Plow
90. Space Heater
91. Air Sparging System
92. Carbon Treatment Sys
93. Chemical Oxidation S
94. Dual Phase Product Recovery System
95. Groundwater Pump and Treat System
96. POET System
97. Shed or Trailer
98. Vapor Extraction System
99. Vapor-Phase Treatment System
100. Other System, Type:___
101. Surge Tank
102. Underground Tank
103. Telemetry System
104. Testing Devices
105. Tractor Trailer
106. Truck, Flatbed
107. Truck, Pickup
108. Truck, Tank Truck
109. Truck, Vacuum
110. Safety Valve
111. Block Valve
112. Extraction Well
113. Monitoring Well
114. Recovery Well
115. Winch
116. Wire Rope
117. No Equipment Involved
118. MPT – Traffic Control Devices
118. Not in List (describe):___

Appendix C – Injury Illness Reporting Flow Chart

Health & Safety Near/Loss – Loss (Incident)*
Notification Flow Chart



* Incident – any work or site-related occurrence that resulted in, or could potentially have resulted in, the need for medical care or in property damage (i.e., all injuries or illnesses, exposure to toxic materials or any other significant occurrence resulting in property damage or in a "near loss")

** Verbal Notification

Initial Incident Report (written) to SHSO, OHSM, OM and CHSM within 24 hours
Follow-up Report within one week.

APPENDIX D

Heavy Equipment Exclusion Zone Policy

HEAVY EQUIPMENT EXCLUSION ZONE MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/2019**
REVISION NUMBER	:	**1**

TABLE OF CONTENTS

1. PURPOSE

The purpose of the Exclusion Zone Management Program is to establish the minimum clearance distance that must be maintained between workers and heavy equipment while equipment is in operation (i.e., engaged or moving). The intent is to have no personnel or equipment entering the Exclusion Zone while the equipment is in operation or moving to ensure that Roux and Subcontractor employees are not unnecessarily exposed to the hazards of the equipment.

2. SCOPE AND APPLICABILITY

This Management Program applies to all Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") employees and their subcontractors who are performing field work and are potentially exposed to heavy equipment. For the purpose of this program, heavy equipment includes, but is not necessarily limited to: excavation equipment, drill rigs, vacuum trucks, forklifts, lull telehandlers, man lifts, bobcats, delivery trucks, etc.

3. PROCEDURES

As specified in the following sections of this Program, an Exclusion Zones must be established and maintained during activities involving the movement/operation of heavy equipment. The Exclusion Zone requirements apply to all personnel on the site but are primarily focused on those personnel who are required to be working in the vicinity of the equipment. The exclusion zone is in effect when heavy equipment is moving or engaged (ex. movement of an arm or bucket of an excavator, rotation of an auger, lifting of a load with a forklift, raising/lowering of a man lift, etc.).

1. The Exclusion Zone must meet the following minimum requirements:
   - A minimum distance of 10 feet from all heavy equipment and loads being moved by the equipment;
   - Greater than the swing/reach radius of any moving part on the heavy equipment (i.e., for large equipment this may mean an exclusion zone distance larger than 20 feet);
   - Greater than the tip-over distance of the heavy equipment; and
   - Greater than the radius of blind spots.

   The size of the Exclusion Zone will need to be determined on a task-specific basis considering the size of the heavy equipment in use and the task being performed. Prior to all heavy equipment operations, the Exclusion Zone(s) distance must be specifically identified in the Job Safety Analysis (JSA).
2. The spotter (or another individual) should be assigned responsibility for enforcing the Exclusion Zone. The spotter should be positioned immediately outside of the Exclusion Zone within a clear line of sight of the equipment operator. The spotter must signal the operator to stop work if anyone or anything has the potential to enter or compromise the Exclusion Zone. The operator should stop work if the spotter is not within his/her line of sight. If multiple pieces of equipment are being used, each piece of equipment must have its own Exclusion Zone and spotter. For large excavation and demolition projects the spotter should be in constant radio contact (not cell phone) with the machine driver.
3. If an individual must enter the Exclusion Zone, the designated Spotter must signal the Equipment Operator to stop the equipment. Once the equipment is no longer moving (ex. movement of an arm of an excavator is STOPPED, lifting of a load with a forklift STOPPED, raising/lowering of a man lift is

STOPPED, etc.), the operator must DISENGAGE THE CONTROLS and STOP and SIGNAL BY "SHOWING HIS HANDS". This signal will indicate that it is safe for the personnel to enter the limits of the Exclusion Zone to perform the required activity. The equipment must remain completely stopped/disengaged until all personnel have exited the limits of the Exclusion Zone and the designated Spotter has signaled by "SHOWING HIS HANDS" to the Equipment Operator that it is safe to resume operations.

4. When entering the limits of the Exclusion Zone, personnel must at a minimum:
   - Establish eye contact with the operator and approach the heavy equipment in a manner that is in direct line of sight to the Equipment Operator;
   - Never walk under any suspended loads or raised booms/arms of the heavy equipment; and
   - Identify a travel path that is free of Slip/Trip/Fall hazards.
5. The Exclusion Zone should be delineated using cones with orange snow fence or solid poles between the cones, barrels, tape or other measures. For work in rights-of-way rigid barriers, such as Jersey barriers or temporary chain link fence should be used. For certain types of wide-spread or moving/mobile equipment operations, such delineation may not be practicable around pieces of equipment or individual work areas. In such instances, it is expected that the entire operation will be within a larger secure work area or that additional means will be utilized to ensure security of the work zone.

All subcontractors who provide heavy equipment operations to field projects must implement a program that meets or exceeds the expectations described above as well as any additional requirements that may be required on a client or site-specific basis.

3.1 Exceptions

It is recognized that certain heavy equipment activities may require personnel to work within the limits of the Exclusion Zone as specified in this program. Such activities may include certain excavation clearance tasks, drill crew activities or construction tasks. However, any such activity must be pre-planned with emphasis on limiting the amount and potential exposure of any activity required within the zone. The critical safety steps to mitigate the hazards associated with working within the Exclusion Zone must be defined in the JSA and potentially other project-specific plans (i.e., critical lift plans, etc.), and approved by the Roux Project Principal and client representative, if required, prior to implementation.

4. TRAINING

Many Roux projects have different requirements that are client-specific or site-specific in nature. It is the responsibility of the Project Principal (or Project Manager if delegated this responsibility by the Project Principal) to ensure that the workers assigned to his/her projects are provided orientation and training with respect to these client and/or site-specific requirements.

TRAFFIC CONTROL GUIDANCE
MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**1**

TABLE OF CONTENTS

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has established this Traffic Control Guidance Management Program to assure its employees and contractors work safely in situations where they are exposed to traffic hazards. This document provides guidance for assessing traffic hazards, mitigating traffic hazards and developing a traffic control plan for Roux projects to maintain a safe and secure work environment, provide a safe and efficient means of travel through a work area, and ensuring egress points are not obstructed in case of an emergency. (Note: Use of the word traffic is to be inclusive of vehicles and pedestrians.)

2. SCOPE AND APPLICABILITY

This guidance document shall be used when conducting work on Roux projects with actual or potential traffic hazards from external or internal traffic including:

- Active sites or facilities (e.g. parking lots, terminals, third party sites)
- Inactive and vacant sites
- Roadways, rights-of-ways

Nothing specified in this guidance document should be construed to suggest conducting work or traffic control in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site requirements. This document provides guidance for traffic control and may not contain all the information necessary to develop and implement a traffic control plan for public roadways. If necessary, a traffic control professional and/or licensed traffic control company should be contacted.

3. REQUIREMENTS AND MINIMUM SAFETY EXPECTATIONS

A Traffic Control Plan is used for the safe movement of vehicle and pedestrian traffic through a work zone/site and must be developed for each site with actual or potential traffic hazards.

The plan must include:

- Site map* that shows the location of work, flaggers, appropriate buffer areas, traffic flow, parking areas, existing structures and any required traffic control devices; and
- Established maximum speed limits for the site.

* For sites where work zones and/or traffic plans are changing frequently, consider using laminated site maps to allow for updates.

Safety Expectations

- Vehicles and heavy equipment must have an audible reverse signal or a horn will be used to signal backing.
- If backing a work vehicle is required, use a spotter and sound the horn twice before backing. If a spotter is not available, sound the horn twice before backing.
- Individuals who are not familiar with the work site are not permitted to drive on site without an escort.
- Identify a safe entrance and exit path for personnel, vehicles, trucks and heavy equipment that is clear of obstructions, requires no or minimal backing and allows maximum visibility for drivers and

others in the area. If visibility is obstructed when entering or exiting the site, mirrors must be installed to enhance visibility or a spotter must be used.

- Establish check-in / check-out procedures for heavy equipment onsite.
- Traffic control must be in place before any work that exposes individuals to a traffic hazard is conducted. All work should be completed before traffic control devices are removed.
- Traffic control devices must be secured to prevent movement in windy conditions.
- The Site Health and Safety Officer (SHSO) is responsible for communicating the traffic control plan including traffic communication methods to all site personnel prior to the start of any activities and periodically assessing site conditions and revising the traffic control plan as needed.

3.1 Buffer Areas

- Buffer area is a lateral and longitudinal area that separates traffic from the work. The minimum buffer area must be established between traffic and personnel, vehicles, and equipment.
- Buffer areas must be sized to provide separation between workers and internal and external traffic including vehicular, heavy equipment and pedestrian.
- The size of buffer zone depends on speed of traffic, volume, type of work, duration of work, visibility of work zone (curves, corners, rises and dips), access and egress and proximity to public facilities.
- If an unauthorized vehicle or pedestrian enters the work zone or buffer area, work must stop immediately and the traffic control plan reevaluated for effectiveness.

3.2 Levels of Traffic Control

Site factors and work factors are used to help determine the level of traffic control needed for safe operations. All work areas should keep in mind pedestrian and small motorized traffic as well as vehicle and heavy equipment traffic. Levels of traffic control are defined as follows:

Factor	Level 1	Level 2	Level 3
Speed in or next to Work Area	Low / <30km/h or 20 mph	High / >30 km/h 20 mph	NA
Use of Heavy Equipment	No	Yes	NA
Work in Public Roadway / Sidewalk/ Footpath	No	Yes	Yes
Lane Closure	No	No	Yes

The highest traffic control level based on the single highest ranking factor in the above table should be implemented. Site-specific factors or hazards not presented in the above table may justify selection of a higher traffic control level and/or additional control devices.

3.2.1 Level 1 Traffic Control

- Use delineators (cones with flags, stacker cones, looper tubes, grabber tubes, etc.) to surround work zone.
  - 1.1 meter (42-inches) in total height.

- 1.2 meter (4 feet) distance between delineators.

- Use caution tape or barricade boards between delineators.
- Use work vehicle parked between workers and on-coming traffic to provide visual warning to and physical protection from traffic.
- If working close to site entrance, use a second line of delineators to create an additional buffer or utilize a spotter.
- Use the buddy system or a watchperson when traffic conditions warrant.

Examples of Level 1 Traffic Control

Figures A1.2.2(a)(b)(c) - Examples of Level 2 Traffic Control

3.2.2 Level 2 Traffic Control

- Plastic security fencing and/or barricades:
  - meter (42-inches) in total height (1.8 meters/6 feet high in areas where drivers have poor visibility or other higher risk factors present).
  - meter (4 feet) distance between delineators.
- Use cautionary signs (e.g., “Men Working”, “Work Zone”) in all directions from which vehicles can approach (recommended 0.8 meter or 32 inches high) and any additional signage/protection required by local, regional or national regulations.
- Use work vehicle parked between workers and on-coming traffic to provide visual warning to and physical protection from traffic.
- If working close to site entrance, use second line of delineators to create an additional buffer or utilize a spotter.

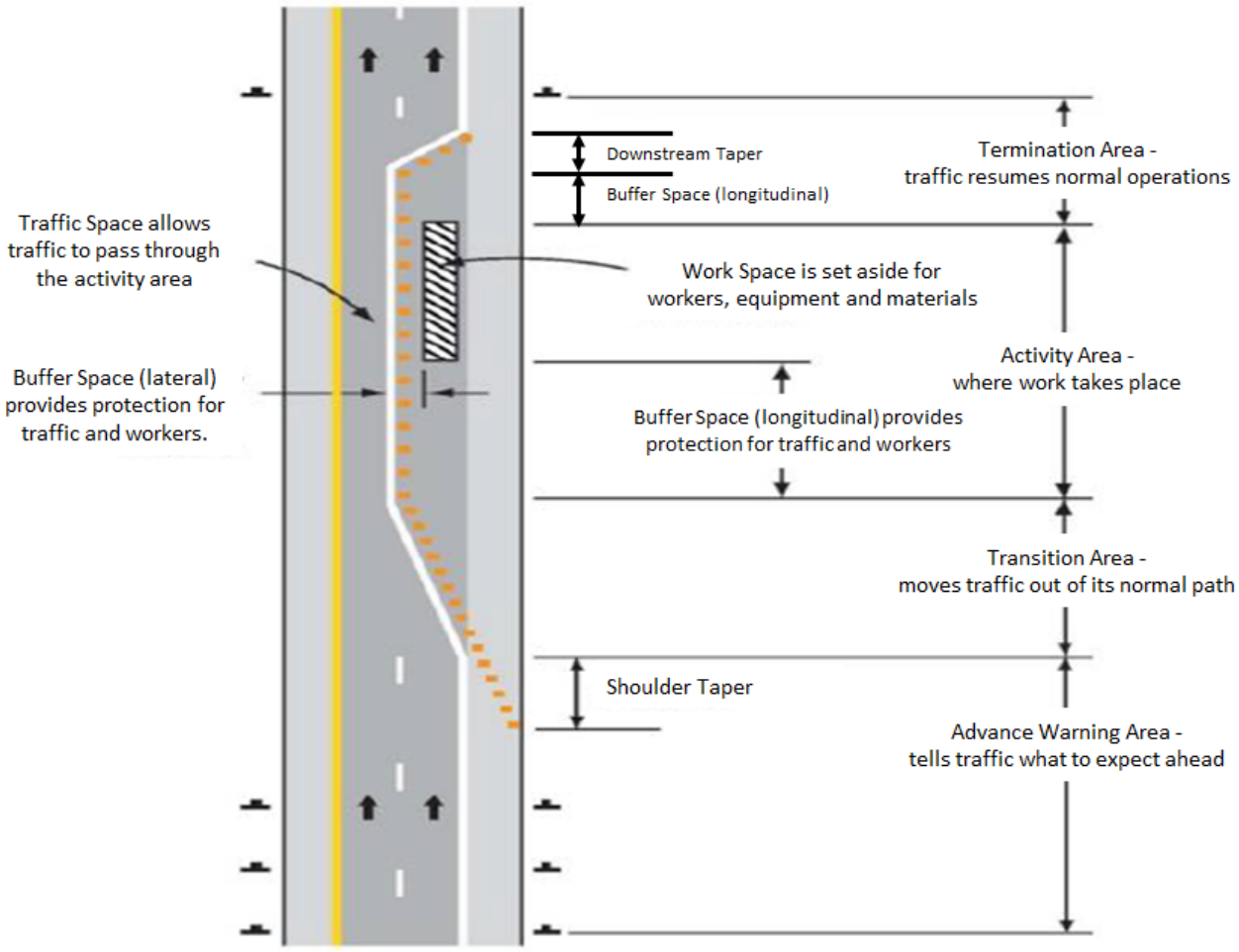
- Use the buddy system or a watchperson when traffic conditions warrant.
- Provide oversight by persons dedicated to traffic control.
- Coordinate work with appropriate authorities which may require a police detail.

Examples of Level 2 Traffic Control

3.2.3 Level 3 Normal Traffic Flow Interruption (Temporary Traffic Control Zone)

A temporary traffic control zone consists of four areas and may be needed when normal traffic flow is interrupted. A temporary control zone is the entire section of roadway between the first warning sign through the last traffic control device, where traffic returns to its normal path. Most temporary traffic control zones are divided into four areas:

1. Advance warning area – drivers are informed what to expect
2. Transition area – redirection of the driver's normal path
3. Activity area – area where the work is taking place
4. Termination area – traffic returns to normal path



Example of a temporary traffic control zone layout

3.3 Flagging

- Flagging is used when all other methods of traffic control are inadequate to direct or control traffic.
- Flagger locations must be documented on the Traffic Control Plan.
- Minimum standard flagging paddle size allowed is 18 inches (.45 m). It is recommended that a 24-inch (.6 m) paddle be used to improve visibility or for high speed operations.

3.4 Parking

Any vehicle not active in site operations should be parked either in a designated parking area or out of the way and/or used as a barrier to oncoming traffic to protect personnel in the work zone.

All parked vehicles (except light-duty pick-up trucks), trailers and heavy equipment; including those needing to idle while in use, must be secured as follows:

- Emergency brake set
- Manual transmission in gear (if not idling) or automatic transmission in “Park”, AND

- One of the following methods:
  - Lowered hydraulic rams
  - Connection of trailer to vehicle that is secured
  - Two properly sized chocks set on either side of a wheel

Please refer to the Wheel Chocking Management Program 2.16 for additional information.

4. TRAFFIC CONTROL PLANNING

4.1 Components of a Traffic Control Plan

A traffic control plan will be part of the site Health and Safety Plan (HASP) and in addition to the items listed in the Minimum Safety Expectations section, should include, but is not limited to the following:

- Traffic control design.
- Traffic control devices.
- Traffic control operations.
- Method for communicating any Traffic Control Plan changes.

4.2 Assessing Traffic Hazards

Before developing the plan, conduct a site/project assessment to identify internal and external traffic hazards including:

- Traffic flow patterns around and within the work zone.
- Vehicle/heavy equipment operations within work zone.
- Entry and exit routes for project-related and third-party vehicles/heavy equipment (e.g., congested roadways, limited visibility).
- High traffic areas (e.g., active roadways, parking lots and garages).
- Terrain conditions (e.g., hills, loose gravel, steep slopes).
- Survey of adjacent sites activities that may change traffic patterns (e.g., school drop-off, pick-up times).
- Weather and lighting conditions.
- Visibility of work area in relation to traffic flow.
- Areas of previous traffic accidents.
- Traffic hazards that may be encountered when traveling to and from site (including heavy equipment impacts on local streets, turning radius restrictions, etc.).

Movements of motor vehicles, bicycles, and pedestrians around the work zone should be considered, as well as the movements of personnel, vehicles and heavy equipment within the work zone. A work zone is an unexpected obstacle for those not involved in the work and may cause them to respond in unpredictable ways.

Any work in public roadways, right-of-ways, lanes, alleys, or sidewalks may require approval of appropriate jurisdiction, such as a municipality, county, state, or highway authority. This may require an application

for a permit and a permit fee. Work schedules should take into account the time needed to obtain required permits.

In addition, when transporting oversized equipment to a site over public roadways or right-of-ways coordinate with local jurisd ictions for needed traffic control and permits.

4.3 Buddy System or Watchperson

If there are any questions regarding number of personnel required to safely perform project tasks on a site, a two-person crew should be dispatched for the first site visit for potential use of one person as a traffic watch. Subsequent review will determine if site activity remains a two-person job.

A two-person crew should also be scheduled if:

- Location requires traffic to be redirected into another lane or detoured.
- Traffic lane will be temporarily closed.
- Work is conducted alongside heavily-traveled roadway.
- Pedestrian or cyclists require direction or assistance for temporary crossing/diversion.
- Areas where hybrid or electric vehicles are prevalent since they may not be heard at slow speeds.

4.4 Project Specific Hazards

When working at active sites:

- Determine safest travel routes into and out of work areas for project-related vehicles and heavy equipment.
- If possible, minimize work-related impacts on existing site operations.
- Discuss TCP with site operator/manager and others who may be impacted.

When work involves excavation, consider the following:

- Space for support of the sidewalls (sloping, benching, shoring, and/or trench boxing)
- Space for the safe movement of workers and heavy equipment around the excavation.
- Should controls, such as physical barriers or visual indicators, be applied to limit access to utilities?
- When working near aboveground or underground utilities, consider the following:
  - Can equipment be operated in a way to maintain safe distances from overhead utilities?
  - Could equipment displace or crush underground utilities?

When laying out work zones, consider the following in allowing space for work activities:

- Can equipment and materials be delivered, stored, and handled readily?
- Can workers perform their tasks safely and efficiently?
- Is there space to walk so as to minimize slip, trip, and fall hazards?
- Are two-way roads three-times as wide as the widest piece of equipment using the road or does traffic need to be controlled?

On-Site Workers should take the following actions:

- Check surroundings often for potential changing traffic hazards.
- Listen for and respond to warnings such as horns, whistles, and sirens.
- Position yourself facing traffic. Where this is not practical, a “second set of eyes” should be considered such as a buddy or watchperson.
- If walking on/near a road or access way, walk in single file (not in a group) towards/facing oncoming traffic.
- Remove hearing protection when not needed.
- Look out for the safety of other workers in area.
- Turn off cell phones and do not use while operating or being in the vicinity of operating vehicles / heavy equipment.

4.5 Deploying/Removing Traffic Control Devices

- Begin placing devices in upstream (traffic advance warning area) locations.
- Flag person used to warn incoming traffic should be placed far enough in front of work zone to allow vehicles to maneuver.
- Delineate transition zone with cones and barricades.
- Establish work zone.
- Delineate downstream taper.
- Place signs for end of work zone.
- Remove devices in reverse order of deployment (remove devices at beginning of set-up last).

4.6 Traffic Control Devices

The work zone should be highly visible so that drivers can see and avoid the area. Geometry, color and reflectivity of devices affect how people see them. Location of devices relative to terrain and other objects also affects visibility. Visibility may be enhanced by increasing the height and number of traffic control devices.

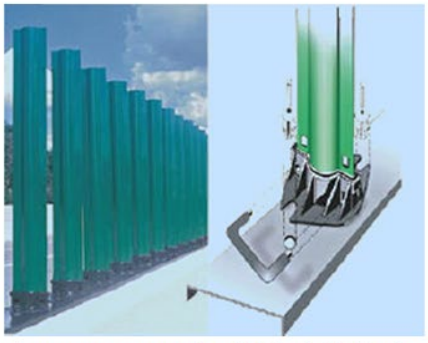
Traffic Control devices provide visibility and can include the following:

- Traffic cones with flags, looper tubes, grabber tubes and stacker cones (recommended height 1.1 meter/ 42 inches)
- High visibility security / temporary fencing (may require addition of reflective tape or lights)
- Warning tape
- Reflective tape
- Automated Flagger Assistance Device
- Warning and speed limit signs (e.g., "Caution Work Area")
- Traffic flow arrows (e.g., posted or painted on ground)
- Molded plastic barricades (sawhorses)

- Type I and II barricades
- Plastic channelizers (orange barrels)
- Concrete barriers (Jersey barriers or K-rails)
- Water-filled barricades
- Vehicles used as barricade (with hazard lights activated if possible)
- Light bars and reflective lights on vehicles
- Portable gates
- Glare screens
- Buddy system / Watchperson
- Temporary speed bumps or rumble strips

Commonly used traffic control devices

Extender bars used in place of tape



Glare screens can make a highly visible barrier

Barrier constructed of PVC pipe and orange fencing

Traffic control devices should be routinely inspected to ensure continued integrity and visibility.

Many traffic control devices only provide visual clues to drivers. Physical barriers, such as parked vehicles, concrete barriers, or water filled barriers can provide more protection if a driver has lost control or is not paying attention.

4.7 Night/Low Visibility

As much as practical, work should be conducted during daylight. Night operations may result in poor visibility for drivers and workers.

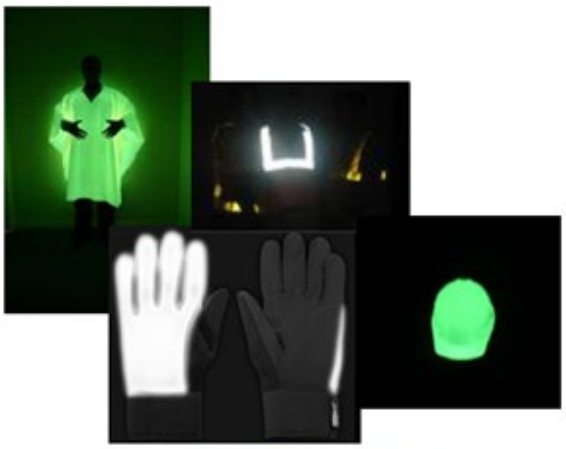
If work must be done at night, additional lighting/traffic control measures should be provided to warn vehicles and pedestrians. Glare from lighting should be controlled so as not to interfere with the vision of workers or drivers.

Nighttime visibility can be increased by:

- Lighted delineators
- Flood lights/Work area lights
- Higher class of high-visibility apparel
- Flashing lights on clothing/vehicles/hard hat
- Glow sticks attached to traffic vests
- Reflective tape on equipment

Glow stick

Lighted traffic control devices



Highly reflective safety gear

APPENDIX E

Subsurface Utility Clearance Management Program

SUBSURFACE UTILITY CLEARANCE MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**2**

TABLE OF CONTENTS

APPENDICES

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has instituted the following program for completing proper utility mark-outs and for conducting subsurface clearance activities. This establishes a method to ensure, to the greatest extent possible, that utilities have been identified and contact and/or damage to underground utilities and other subsurface structures will be avoided.

2. SCOPE AND APPLICABILITY

The Subsurface Utility Clearance Management Program applies to all Roux employees, its contractors and subcontractors. Employees are expected to follow this program for all intrusive work involving Roux or other personnel (e.g., contractors/subcontractors) working for Roux unless the client's requirements are more stringent. Deviation from the program regardless of the specific work activity or work location must be pre-approved based on client's site knowledge, site experience and client's willingness for the use of this program. Any and all exceptions shall be documented and pre-approved by the Project Principal and the Office Manager.

3. PROCEDURES

3.1 Before Intrusive Activities

During the project kick-off meeting for intrusive activities the PM will review the Roux Subsurface Utility Clearance Checklist and Utility Verification (Appendix C) / Site Walkthrough Record (Appendix D) and the below bullet points with the project field team:

(Please note that these are intended as general reminders only and should not be solely relied upon.)

- Ensure the Mark-out / Stake-out Request Information Sheet (or one-call report) is complete and accurate for the site including address and cross streets and review for missing utilities. (Note: utility mark-out organizations do not have contracts with all utilities and it is often necessary to contact certain utilities separately such as the local water and sewer authorities).
- Have written confirmation prior to mobilizing to the site that the firm or Roux personnel performing the intrusive activity has correctly completed the mark-out notification process including requesting mark-outs, waiting for mark-outs to be applied to ground surfaces at the site, and receiving written confirmation of findings (via fax or email) from utility operators for all known or suspected utilities in the proposed area of intrusive activity, and provided utility owner written confirmation to Roux personnel for review and project files documentation.
- Do not begin any intrusive activity until all utilities mark-out has been completed (i.e., did all utilities mark-out the site?) and any unresolved mark-out issues are finalized. Perform a site walk to review the existing utilities and determine if said utilities have been located by the utility locators.

  (Note: The Tolerance Zone is defined as two feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks and other non-cylindrical utilities) of a utility and two feet from the outside edge of any subsurface structure.)
- Install Pre-Clearance exploratory test holes (e.g., hand-dug test holes or other soft digging techniques) for the first 5-ft below land surface (BLS) at each location prior to conducting mechanized intrusive activities. The size of the pre-clearance exploratory test hole should be at a minimum twice the diameter of any downhole tool or boring device. (Note: Pre-Clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for PM and PP to evaluate alternative approaches for the project. Alternative approaches will need to be pre-approved by the OM.

- For excavations, all utilities need to be marked and then exposed by hand following the protocols in this program. Pre-clearing for excavations may be performed by the "moat" technique (i.e., soft digging around the perimeter). In these cases, dig in small lifts (<12" for first 5 feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes performed to expose the utility. Once structures have been verified a minimum clearance of two feet must be maintained between the utility and any powered equipment.
- In addition, the following activities should be conducted:
  - Review the work scope to be performed with the site owner/tenant to determine if it may impact any utilities;
  - Attempt to procure any utility maps or historic drawings of subsurface conditions of the site;
  - **Determine the need for utility owner companies to be contacted or to have their representatives on site**;
  - Where mark-outs terminate at the property boundary, consider the use of private utility locating / GPR / geophysical-type services which may be helpful in locating utilities. Use of private utility locating firms, however, does not eliminate the legal requirement for the Excavator firm to submit a request for Public Utility Mark-outs. Also, the information provided by the service may be inaccurate and unable to locate subsurface utilities and structures in urban areas, landfills, urban fill areas and below reinforced slabs, etc. They should not be relied upon as the only means of performing utility clearance;
  - Documented description of the dig site which is included in the projects Health and Safety Plan (HASP) and one call report will be maintained in the field and distributed amongst Roux personnel its contractors and subcontractors; and
  - Documentation of the actual placement of mark outs in the field shall be collected using dated pictures, videos and/or sketches with distance from markings to fixed objects. All documentation shall be maintained within the project file.

3.2 During Intrusive Activities

The PM, field team lead or personnel performing oversight is to:

- Ensure the mark-out remains valid. (In certain states there are limits regarding the duration of time after the mark-out was applied to the ground surface work can be started or interrupted.) Additionally, the mark-outs must be maintained, documented, and in many cases refreshed periodically to be considered valid, this will be accomplished through calls to the one call center.
- Ensure intrusive activities are only performed within the safe boundaries of the mark-out as detailed in the One-Call Report.
- Halt all work if intrusive activities have resulted in discovery of an unmarked utility. Roux personnel shall notify the facility owner/operator and the one call center. All incidents such as this will be reported as per Roux Incident Investigation and Reporting Management Program.
- Halt all work if intrusive activities must take place outside of the safe boundaries of a mark-out and only proceed after new mark-outs are performed.
- Halt the intrusive activities and immediately consult with the PP if an unmarked utility is encountered.
- Completing any subsurface utility clearance incident reports that are necessary.

- If a utility cannot be found as marked Roux personnel shall notify the facility owner/operator directly or through the one call center. Following notification, the excavation may continue, unless otherwise specified in state law.
- Contractors/subcontractors must contact the one-call center to refresh the ticket when the excavation continues past the life of the ticket. Ticket life shall be dictated by state law however at a maximum ticket life shall not exceed 20 working days.

3.3 Stop Work Authority

Each Roux employee has Stop Work Authority which he or she will execute upon determination of any imminent safety hazard, emergency situation, or other potentially dangerous situation, such as hazardous weather conditions. This Stop Work Authority includes subsurface clearance issues such as the adequacy of a mark-out or identification during intrusive operations of an unexpected underground utility. Authorization to proceed with work will be issued by the PM/PP after such action is reviewed and resolved. The PM will initiate and execute all management notifications and contact with emergency facilities and personnel when this action is appropriate.

Appendix A - Definitions

Intrusive Work Activities — All activities such as digging or scraping the surface, including but not limited to, excavation, test pitting or trenching, soil vapor sampling or the installation of soil borings, soil vapor monitoring points and wells, or monitoring wells, and drilling within the basement slab of a recently demolished building.

Mark-out / Stake Out — The process of contracting with a competent and qualified company to confirm the presence or absence of underground utilities and structures. This process will clearly mark-out and delineate utilities that are identified so that intrusive work activities can be performed without causing disturbance or damage to the subsurface utilities and structures. After utility mark-outs are completed the soft digging will be completed prior to intrusive work.

Tolerance Zone — Defined as two feet on either side of the designated centerline of an identified utility, plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct backs and other non-cylindrical utilities) of that utility and two feet from the outside edge of any subsurface structure.

Structure — For the purpose of this program a structure is defined as any underground feature that may a present potential source(s) of energy such as, but not limited to, utility vaults, bunkers, piping, electrical boxes, wires, conduits, culverts, utility lines, underground tanks and ducts.

Soft Digging — The safest way to remove material from unknown obstructions or services is by using tools such as a vactor or air knife, non-mechanical tools, or hand tools. The methods are clean and non-evasive and used for uncovering and exposing buried services, excavating and for providing a quick method of soil removal from sensitive areas.

Verification — Exploratory test-hole dug with hand tools within the Tolerance Zone to expose and verify the location, type, size, direction-of-run and depth of a utility or subsurface structure. Vacuum excavation (soft dig) methods can further facilitate exposure of a subsurface utility and accurately provide its location and identification prior to intrusive work approaching the Tolerance Zone.

Appendix B - Example of Completed One Call Report

Example Completed One-Call Report

New York 811

Send To: C_EMAIL Seq No: 744

Ticket No: 133451007 ROUTINE

Start Date: 12/16/13 Time: 7:00 AM Lead Time: 20

State: NY County: QUEENS Place: QUEENS
Dig Street: 46TH AVE Address:
Nearest Intersecting Street: VERNON BLVD
Second Intersecting Street: 11TH ST

Type of Work: SOIL BORINGS
Type of Equipment: GEOPROBE
Work Being Done For: ROUX

In Street: X On Sidewalk: X Private Property: Other:
On Property Location if Private: Front: Rear: Side:

Location of Work: MARK THE ENTIRE NORTH SIDE OF THE STREET AND SIDEWALK OF: 46TH AVE BETWEEN VERNON BLVD AND 11TH STREET

Remarks:

Nad: Lat: Lon: Zone:
ExCoord NW Lat: 40.7475399 Lon: -73.9534811 SE Lat: 40.7457406 Lon: -73.9493680

Company : ZEBRA ENVIROMENTAL Best Time: 6AM-5PM
Contact Name: DAVID VINES Phone: (516)596-6300
Field Contact: DAVID VINES Phone: (516)596-6300
Caller Address: 30 N PROSPECT AVE Fax Phone: (516)596-4422
LYNBROOK, NY 11563
Email Address: david@zebraenv.com

Additional Operators Notified:
ATTNY01 AT&T CORPORATION (903)753-3145
CEQ CONSOLIDATED EDISON CO. OF N.Y (800)778-9140
MCINY01 MCI (800)289-3427
PANYNJ01 PORT AUTHORITY OF NY & NJ (201)595-4841
VZQ VERIZON COMMUNICATIONS (516)297-1602

Link to Map for C_EMAIL: http://ny.itic.occinc.com/XGMZ-DF2-L23-YAY

Original Call Date: 12/11/13 Time: 1:15 PM Op: webusr
IMPORTANT NOTE: YOU MUST CONTACT ANY OTHER UTILITIES DIRECTLY

Appendix C - Roux Subsurface Utility Clearance Checklist

Roux Subsurface Utility Clearance Checklist ***Date of Revision – 12/3/14***

Work site set-up and work execution

ACTIVITY	Yes	No	N/A	COMMENTS INCLUDING JUSTIFICATION IF RESPONSE IS NO OR NOT APPLICABLE
Daily site safety meeting conducted, SPSAs performed, JSAs reviewed, appropriate work permits obtained.				
HASP is available and reviewed by site workers / visitors.				
Subsurface Utility Clearance Procedure has been reviewed with all site workers.				
Work area secured; traffic control established as needed. Emergency shut-off switch located. Fire extinguishers / other safety equipment available as needed.				
Utility mark-outs (public / private) clear and visible. Provide Excavator's Stake-Out Reference Number / Request Date / Time.				
Tolerance zone work identified.				
Work execution plan reviewed and adhered to (ground disturbance methods, clearance depths, any special utility protection requirements, or any other execution requirements; especially for Tolerance Zone work).				
Verbal endorsement received from Roux PM for any required field deviations to work execution plan.				

Key reminders for execution:

The Subsurface Utility Clearance Protocol should be referenced to determine all requirements while executing subsurface work. The bullet points below are intended as general reminders only and should not be solely relied upon.

- Tolerance zone is defined as two feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks and other non-cylindrical utilities) of a utility and two feet from the outside of any subsurface structure.
- Install Pre-Clearance exploratory test holes (e.g., hand-dug test holes or vacuum excavation) must be performed for the first five feet below land surface (BLS) at each location prior to conducting mechanized intrusive activities. The size of the pre-clearance exploratory test hole should be at a minimum twice the diameter of any downhole tool or boring device. (Note: Pre-clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for PM and PP to evaluate alternative approaches for the project. Alternate approaches will need to be pre-approved by the OM.
- For excavations, all utilities need to be marked and then exposed by hand following the protocols in this program. Pre-clearing for excavations may be performed by the "moat" technique (i.e., soft

digging around the perimeter). In these cases, dig in small lifts (<12" for first five feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes to expose the utility. Once structures have been verified a minimum clearance of two feet must be maintained between the utility and any powered equipment.

Appendix D - Utility Verification/Site Walkthrough Record

Employee Name: _____

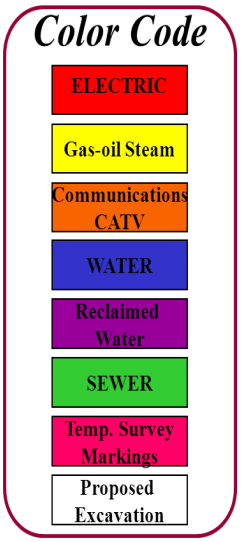
Date: _____

Instructions: For each utility suspected at the job site, indicate location on the job site, approximate burial depth, and means of detecting the utility. Leave blank if that utility is not believed to be present.

Utility	Description of Utility Location Identified Onsite	Approx. Depth (bls)	Method / Instrumentation used to determine Utility Location	Utility Owner Response (Date/Time)	Mark Out Indicates (Clear / Conflict)
Electrical Lines					
Gas Lines					
Pipelines					
Steam Lines					
Water Lines					
Sanitary and Stormwater Sewer lines					
Pressured Air-Lines					
Tank Vent Lines					
Fiber Optic Lines					
Underground Storage Tanks					
Phone Lines/ Other					

* bls - below land surface

Site Sketch Showing Utilities:



Other Comments / Findings:

Completed by: _____

Signature: _____ Date: _____

APPENDIX F

Personal Protective Equipment Management Program

PERSONAL PROTECTIVE EQUIPMENT MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**4**

TABLE OF CONTENTS

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has instituted the following program to establish guidelines for the selection of personal protective equipment (PPE) for use by Roux personnel performing field activities in hazardous environments. PPE is not meant to be a substitute for engineering, work practice, and/or administrative controls, but PPE should be used in conjunction with these controls to protect the employees in the work place. Clothing, body coverings, and other accessories designed to prevent worker exposure to workplace hazards are all types of PPE. To ensure adequate PPE employee-owned PPE is evaluated on a case-by-case basis to insure its adequacy, maintenance and sanitation.

2. SCOPE AND APPLICABILITY

These guidelines apply to all PPE selection decisions to be made in implementing the Roux program. The foundations for this program are the numerous Occupational Health and Safety Administration (OSHA) standards related to PPE cited in 29 CFR 1910 Subpart I, 29 CFR 1926 Subpart E, and the hazardous environment work employee protection requirements under the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 and 1926.65. To ensure hazard assessments are documented the levels of protection, types of protection and tasks requiring protection are covered in site-specific Health and Safety Plans (HASPs) and Job Safety Analyses (JSAs).

3. PROCEDURES

Due to the varied nature of site activities and the different potential hazards associated with different sites, several aspects must be considered when selecting PPE. The following text describes PPE selection logic and provides guidelines and requirements for the appropriate selection and use of PPE.

3.1 Introduction

To harm the body, chemicals must first gain entrance. The intact skin and the respiratory tract are usually the first body tissues attacked by chemical contaminants. These tissues provide barriers to some chemicals but in many cases, are damaged themselves or are highly permeable by certain chemical compounds. Personal protective equipment therefore is used to minimize or eliminate chemical compounds coming into contact with these first barrier tissues.

The proper selection of equipment is important in preventing exposures. The PM making the selection will have to take several factors into consideration. The level of protection, type and kind of equipment selected depends on the hazardous conditions and in some cases cost, availability, compatibility with other equipment, and performance. An accurate assessment of all these factors must be made before work can be safely carried out.

3.2 Types of PPE

The type and selection of PPE must meet certain general criteria and requirements as required under OSHA 29 CFR 1910.132 and 1926.95. In addition to these general requirements, specific requirements and specifications exist for some types of PPE that form the basis of the protective clothing scheme. Following is a list of the common types of specific PPE and the specific requirements for the PPE type, where applicable:

1. Hard Hats - Regulated by 29 CFR 1910.135 and 1926.100; and, specified in ANSI Z89.1.

2. Face Shields and Safety Glasses - Regulated by 29 CFR 1910.133 and 1926.102; and, specified in ANSI Z87.1.
3. Respiratory Protection - Regulated by 29 CFR 1910.134 and 1926.103.
4. Hand Protection - Not specifically regulated.
5. Foot Protection - Regulated by 29 CFR 1910.136 and 1926.96; and, specified in ANSI Z41.1.
6. Protective Clothing (e.g., fully encapsulated suits, aprons) - Not specifically regulated.

3.3 Protective Clothing Selection Criteria

3.3.1 Chemicals Present

The most important factor in selecting PPE is the determination of what chemicals the employee may be exposed to. On field investigations, the number of chemicals may range from a few to several hundred. The exact chemicals or group of chemicals present at the site (certain groups tend to require similar protection) can be determined by collecting and analyzing samples of the air, soil, water, or other site media. When data are lacking, research into the materials used or stored at the site can be used to infer chemicals possibly on the site.

Once the known or suspected chemicals have been identified, and taking into consideration the type of work to be performed, the most appropriate clothing shall be selected.

Protective garments are made of several different substances for protection against specific chemicals. There is no universal protective material. All will decompose, be permeated by, or otherwise fail to protect under given circumstances. Fortunately, most manufacturers make guides to the use of their products (i.e., Dupont's Tyvek™ Permeation Guide). These guides are usually for gloves and coveralls and typically provide information regarding chemical degradation rates (failure of the material to maintain structural integrity when in contact with the chemical), and may provide information on the permeation rate (whether or not the material allows the chemical to pass through). When permeation tables are available, they shall be used in conjunction with degradation tables to determine the most appropriate protective material.

During most site work, chemicals are usually in mixed combinations and the protective materials are not in continuous contact with pure chemicals for long periods of time; therefore, the selected material may be adequate for the particular chemical and type of work being performed, yet not the "best" protecting material for all site chemicals and activities. Selection shall depend upon the most hazardous chemicals based on their hazards and concentrations. Sometimes layering, using several different layers of protective materials, affords the best protection.

3.3.2 Concentration of the Chemical(s)

One of the major criteria for selecting protective material is the concentration of the chemical(s) in air, liquid, and/or solid state. Airborne and liquid chemical concentrations should be compared to the OSHA standards and/or American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute for Occupational Safety and Health (NIOSH) guidelines to determine the level of skin or other absorptive surface (e.g., eyes) protection needed. While these standards are not designed specifically for skin exposed directly to the liquid, they may provide skin designations indicative of chemicals known to have significant skin or dermal absorption effects. For example, airborne levels of PCB on-site may be

low because it is not very volatile, so the inhalation hazard may be minimal; however, PCB-containing liquid coming in direct contact with the skin may cause overexposure. Thus, PCB has been assigned a skin designation in both the OSHA and ACGIH exposure limit tables.

3.3.3 Physical State

The characteristics of a chemical may range from nontoxic to extremely toxic depending on its physical state. Inorganic lead in soil would not be considered toxic to site personnel, unless it became airborne, since it is generally not absorbed through the intact skin. Organic lead in a liquid could be readily absorbed. Soil is frequently contaminated with hazardous materials. Concentrations will vary from a few parts per million to nearly one hundred percent. The degree of hazard is dependent on the type of soil and concentration of the chemical. Generally speaking, "dry" soils do not cause a hazard to site personnel if they take minimal precautions such as wearing some type of lightweight gloves.

3.3.4 Length of Exposure

The length of time a material is exposed to a chemical increases the probability of breakthrough. Determinations of actual breakthrough times for short-term exposures indicate that several different materials can be used which would be considered inadequate under long-term exposures. It should be kept in mind that during testing, a pure (100% composition) liquid is usually placed in direct contact with the material producing a worst-case situation.

3.3.5 Abrasion

When selecting protective clothing, the job the employee is engaged in must be taken into consideration. Persons moving drums or performing other manual tasks may require added protection for their hands, lower chest and thighs. The use of leather gloves and a heavy apron over the other normal protective clothing will help prevent damage to the normal PPE and thus reduce worker exposures.

3.3.6 Dexterity

Although protection from skin and inhalation hazards is the primary concern when selecting PPE, the ability to perform the assigned task must be maintained. For example, personnel cannot be expected to perform work that requires fine dexterity if they must wear a thick glove. Therefore, the PPE selection process must consider the task being performed and provide PPE alternatives or techniques that allow dexterity to be maintained while still protecting the worker (e.g., wearing tight latex gloves over more bulky hand protection to increase dexterity).

3.3.7 Ability to Decontaminate

If disposable clothing cannot be used, the ability to decontaminate the materials selected must be taken into consideration. Once a chemical contacts the material, it must be cleaned before it can be reused. If the chemical has completely permeated the material, it is unlikely that the clothing can be adequately decontaminated and the material should be discarded.

3.3.8 Climactic Conditions

The human body works best with few restraints from clothing. Protective clothing adds a burden by adding weight and restricting movement as well as preventing the natural cooling process. In severe situations, a modified work program must be used.

Some materials act differently when they are very hot and very cold. For example, PVC becomes almost brittle in very cold temperatures. If there are any questions about the stability of the protective materials under different conditions, the manufacturer should be contacted.

3.3.9 Work Load

Like climactic conditions, the type of work activity may affect work duration and the ability or personnel to perform certain tasks. Similarly, the amount of protective materials a person wears will affect their ability to perform certain tasks. For example, a person in a total encapsulating suit, even at 72 ^{o}F, cannot work for more than a short period of time without requiring a break.

The work schedule should be adjusted to maintain the health of the employees. Special consideration should be given to the selection of clothing that both protects and adds the least burden when personnel are required to perform strenuous tasks. Excessive bodily stress frequently represents the most significant hazard encountered during field work.

3.4 Types of Protective Materials

1. Cellulose or Paper
2. Natural and Synthetic Fibers
    a. Tyvek™
    b. Nomex™
3. Elastomers
    a. Polyethylene
    b. Saran
    c. Polyvinyl Chloride (PVC)
    d. Neoprene
    e. Butyl Rubber
    f. Viton

3.5 Protection Levels

3.5.1 Level A Protection

Level A protection (a fully encapsulated suit) is used when skin hazards exist or when there is no known data that positively rule out skin and other absorption hazards. Since Level A protection is extremely physiologically and psychologically stressful, the decision to use this protection must be carefully considered. At no time will Level A work be performed without the consent of the OM. The following conditions suggest a need for Level A protection:

- confined facilities where probability of skin contact is high;
- sites containing known skin hazards;
- sites with no established history to rule out skin and other absorption hazards;
- atmosphere immediately dangerous to life and health (IDLH) through the skin absorption route;
- site exhibiting signs of acute mammalian toxicity (e.g., dead animals, illnesses associated with past entry into site by humans);

- sites at which sealed drums of unknown materials must be opened;
- total atmospheric readings on the Photoionization Detector (PID), Flame Ionization Detector (FID), and similar instruments indicate 500 to 1,000 ppm of unidentified substances; and
- extremely hazardous substances (e.g., cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens and infectious substances) are known or suspected to be present and skin contact is possible.

The following items constitute Level A protection:

- open circuit, pressure-demand self-contained breathing apparatus (SCBA);
- totally encapsulated suit;
- gloves, inner (surgical type);
- gloves, outer;
- chemical protective;
- boots, chemical protective, steel toe and shank;
- radiation detector (if applicable); and
- communications.

3.5.2 Level B Protection

Level B protection is utilized when the highest level of respiratory protection is needed but hazardous material exposure to the few unprotected areas of the body is unlikely.

The following conditions suggest a need for Level B protection:

- the type and atmospheric concentration of toxic substances have been identified and they require the highest level of respiratory protection;
- IDLH atmospheres where the substance or concentration in the air does not present a severe skin hazard;
- the type and concentrations of toxic substances do not meet the selection criteria permitting the use of air purifying respirators; and
- it is highly unlikely that the work being done will generate high concentrations of vapors, gases or particulates, or splashes of materials that will affect the skin of personnel.

Personal protective equipment for Level B includes:

- open circuit, pressure-demand SCBA;
- chemical protective clothing:
- overalls and long-sleeve jacket; or
- coveralls;
- gloves, inner (surgical type); gloves, outer, chemical protective;
- boots, chemical protective, steel toe and shank; and
- communications optional.

3.5.3 Level C Protection

Level C protection is utilized when both skin and respiratory hazards are well defined and the criteria for the use of negative pressure respirators have been fulfilled (i.e., known contaminants and contaminant concentrations, acceptable oxygen levels, approved filter/cartridge available, known cartridge service life, etc.). Level C protection may require carrying an emergency escape respirator during certain initial entry and site reconnaissance situations, or when applicable thereafter.

Personal protective equipment for Level C typically includes:

- full facepiece air-purifying respirator;
- emergency escape respirator (optional);
- chemical protective clothing:
  - overalls and long-sleeved jacket; or
  - coveralls;
- gloves, inner (surgical type);
- gloves, outer, chemical protective; and
- boots, chemical protective, steel toe and shank.

3.5.4 Level D Protection

Level D is the basic work uniform. Personal protective equipment for Level D includes:

- coveralls;
- safety boots/shoes;
- eye protection;
- hand protection;
- reflective traffic safety vest (mandatory for traffic areas or railyard);
- hard hat (with face shield is optional); and
- emergency escape respirator is optional.

3.5.5 Level E Protection

Level E protection is used when radioactivity above 10 mr/hr is detected at the site. Personal protective equipment for Level E includes:

- coveralls;
- air purifying respirator;
- time limits on exposure;
- appropriate dermal protection for the type of radiation present; and
- radiation dosage monitoring.

3.5.6 Additional Considerations

Field work will contain a variety of situations due to chemicals in various concentrations and combinations. These situations may be partially ameliorated by following the work practices listed below:

1. Some sort of foot protection is needed on a site. If the ground to be worked on is contaminated with liquid and it is necessary to walk in the chemicals, some sort of protective "booties" can be worn over the boots. This cuts down on decontamination requirements. They are designed with soles to help prevent them from slipping around. If non-liquids are to be encountered, a Tyvek™ bootie could be used. If the ground contains any sharp objects, the advantage of booties is questionable. Boots should be worn with either cotton or wool socks to help absorb the perspiration.

2. If the site situation requires the use of hard hats, chin straps should be used if a person will be stooping over where his/her hat may fall off. Respirator straps should not be placed over the hard hats. This will affect the fit of the respirator.

   Some types of protective materials conduct heat and cold readily. In cold conditions, natural material clothing should be worn under the protective clothing. Protective clothing should be removed prior to allowing a person "to get warm". Applying heat, such as a space heater, to the outside of the protective clothing may drive the contaminants through. In hot weather, under clothing will absorb sweat. It is recommended that workers use all cotton undergarments.

3. Body protection should be worn and taped to prevent anything from running into the top of the boot. Gloves should be worn and taped to prevent substances from entering the top of the glove. Duct tape is preferred, but masking tape can be used. When aprons are used, they should be taped across the back for added protection. However, this should be done in such a way that the person has mobility.

4. Atmospheric conditions such as precipitation, temperature, wind direction, wind velocity, and pressure determine the behavior of contaminants in air or the potential for volatile material getting into the air. These parameters should be considered in determining the need for and the level of protection.

5. A program must be established for periodic monitoring of the air during site operations. Without an air monitoring program, any changes would go undetected and might jeopardize response personnel. Monitoring can be done with various types of air pumps and filtering devices followed by analysis of the filtration media; personnel dosimeters; and periodic walk-throughs by personnel carrying real-time survey instruments.

6. For operations in the exclusion zone, different levels of protection may be selected, and various types of chemical-resistant clothing may be worn. This selection should be based on the job function, reason for being in the area, and the potential for skin contact with, or inhalation of, the chemicals present.

7. Escape masks must be readily available when levels of respiratory protection do not include a SCBA and the possibility of an IDLH atmosphere exists. Their use can be made on a case-by-case basis. Escape masks could be strategically located at the site in areas that have higher possibilities of vapors, gases or particulates.

APPENDIX G

COVID-19 Interim Health and Safety Guidance

COVID-19 INTERIM HEALTH AND SAFETY GUIDANCE

CORPORATE HEALTH AND SAFETY MANAGER	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**03/2020**
REVISION DATE	:	**01/10/2022**
REVISION NUMBER	:	**8**

TABLE OF CONTENTS

APPENDICES

1. PURPOSE

This guidance has been implemented to establish work practices, administrative procedures, and engineering controls to minimize potential exposure to SARS-CoV-2, the virus that causes COVID-19. The following guidance has been developed based on local, state and federal recommendations/requirements regarding COVID-19. The purpose of this document is to supplement existing site-specific Health and Safety Plans (HASPs) and provide interim health and safety guidance to minimize potential exposure to SARS-CoV-2. Should additional scientific information or regulatory information change, this document shall be updated accordingly.

2. SCOPE AND APPLICABILITY

This guidance covers all Roux employees and the subcontractors that Roux oversees. Site specific HASPs shall be developed to incorporate elements of mitigative measures against COVID-19 exposure. If work cannot be carried out in compliance with this guidance, the project shall be further evaluated by the Project Principal (PP), Office Manager (OM), and Corporate Health and Safety Director (CHSD) prior to work authorization.

Roux subcontractors are required to review, comply with, and implement Roux's COVID-19 Interim Health and Safety Guidance while on Site. Subcontractors may implement additional preventative measures as they see fit. All work shall be conducted in a manner consistent with the federal, state, and local guidance as it relates to COVID-19.

3. BACKGROUND

What is COVID-19?

COVID-19 is a respiratory illness that can spread from person to person. The virus that causes COVID-19 is a novel coronavirus that was first identified during an investigation into an outbreak in Wuhan, China. This virus continues to spread internationally and within the United States. Multiple variants of the virus that causes COVID-19 are circulating globally. There are currently several vaccines which have been developed which are authorized, recommended and effective at protecting you from getting sick.

What are the symptoms of COVID-19?

Reported illnesses have ranged from mild symptoms to severe illness and death for confirmed COVID-19 cases. Symptoms may appear 2 to 14 days following exposure to the virus. People with these symptoms or combinations of symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

This list is not all possible symptoms. The CDC will continue to update this list as they learn more about the virus. For an updated symptom list please reference the following link for CDC Symptoms of Coronavirus.

If someone develops emergency warning signs for COVID-19, they should be instructed to get medical attention immediately. Emergency warning signs can include those listed below; however, this list is not all inclusive. Please consult your medical provider for any other symptoms that are severe or concerning.

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion
- Inability to wake or stay awake
- Pale, gray, or blue-colored skin, lips, or nail beds, depending on skin tone

How does COVID-19 spread?[1]

Individuals who are within close contact (within 6 feet) of a person with COVID-19 or have direct contact with that person are at greatest risk of infection.

COVID-19 spreads in three main ways:

- Breathing in air when close to an infected person who is exhaling small droplets and particles that contain the virus.
- Having these small droplets and particles that contain virus land on the eyes, nose, or mouth, especially through splashes and sprays like a cough or sneeze.
- Touching eyes, nose, or mouth with hands that have the virus on them.

Transmission of SARS-CoV-2 from inhalation of virus in air farther than six feet from an infectious source can occur.

Some infections can be spread by exposure to virus in small droplets and particles that can linger in the air for minutes to hours. These viruses may be able to infect people who are further than 6 feet away from the person who is infected or after that person has left the space. This kind of spread is referred to as **airborne transmission** and is an important way that infections like tuberculosis, measles, and chicken pox are spread. Per published reports, factors that increase the risk of SARS-CoV-2 infection under these circumstances include:

- Enclosed spaces with inadequate ventilation or air handling within which the concentration of exhaled respiratory fluids, especially very fine droplets and aerosol particles, can build-up in the air space.
- Increased exhalation of respiratory fluids if the infectious person is engaged in physical exertion or raises their voice (e.g., exercising, shouting, singing).
- Prolonged exposure to these conditions, typically more than 15 minutes.

Spread from contact with contaminated surfaces or objects is less common.

Respiratory droplets can also land on surfaces and objects. It is possible that a person could get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or eyes. Spread from touching surfaces is not thought to be a common way that COVID-19 spreads.

4. TRAINING REQUIREMENTS

All employees with potential exposure to COVID-19 shall be provided training that incorporates COVID-19 exposure mitigation strategies, such as implementation of proper social distancing, personal hygiene (e.g., handwashing), as well as disinfection procedures, as outlined by CDC guidelines.

5. EXPOSURE RISK POTENTIAL

Worker risk of occupational exposure to COVID-19 can vary from very high, high, medium, or lower (caution) risk. This level of exposure is dependent on several factors, which can include industry type; need for contact within 6 feet of people known to be or suspected of being infected with COVID-19; density of work environment; and industrial setting (i.e., healthcare building, occupied interior work area, minimal ventilation).

Provided below is background risk level information taken from the U.S. Department of Labor Occupational Safety and Health Administration Guidance on preparing workplaces for COVID-19. Risk evaluations for each project shall be conducted by the PP and OM in consultation with the CHSD to ensure Roux employees and subcontractors remain within the lower exposure (caution) category. If it is identified there is a medium exposure risk or higher, further evaluation and mitigative measures shall be evaluated to reduce overall exposure risk prior to work authorization.

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1 How COVID-19 Spreads https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html#edn1

Very High Exposure Risk (Activities not conducted by Roux)

Very high exposure risk includes occupations/work activities with high potential for exposure to known or suspected sources of COVID-19 during specific medical, postmortem, or laboratory procedures. This can include but is not limited to:

- Healthcare workers (e.g., doctors, nurses, dentists, paramedics, emergency medical technicians) performing aerosol-generating procedures (e.g., intubation, cough induction procedures, bronchoscopies, some dental procedures and exams, or invasive specimen collection) on known or suspected COVID-19 patients.
- Healthcare or laboratory personnel collecting or handling specimens from known or suspected COVID-19 patients (e.g., manipulating cultures from known or suspected COVID-19 patients).

High Exposure Risk (Activities not conducted by Roux)

High exposure risk occupations/work activities include exposure to known or suspected COVID-19 positive individuals. This can include but not limited to:

- Healthcare delivery and support staff (hospital staff who must enter patients' rooms) exposed to known or suspected COVID-19 patients.
- Medical transport workers (ambulance vehicle operators) moving known or suspected COVID-19 patients in enclosed vehicles.
- Mortuary workers involved in preparing bodies for burial or cremation of people known to have, or suspected of having, COVID-19 at the time of death.
- Those who have frequent or sustained contact with coworkers, including under close working conditions indoors or in poorly ventilated spaces in various types of industrial, manufacturing, agriculture, construction, and other critical infrastructure workplaces.
- Those who have frequent indoor or poorly ventilated contact with the general public, including workers in retail stores, grocery stores or supermarkets, pharmacies, transit and transportation operations, law enforcement and emergency response operations, restaurants, and bars.

Medium Exposure Risk

Medium exposure risk occupations/work activities include those that require frequent and/or close contact with (i.e., within 6 feet for a cumulative total of 15 minutes or more over a 24-hour period)) people who may be infected with COVID-19, but who are not known or suspected to be COVID-19 positive. For most of our worksites, it is assumed there is on-going community transmission for COVID-19. Therefore, workers who work at sites and may have contact with the general public, other contractors, high-population-density work environments (i.e., greater than 10 people) fall within medium exposure risk group category. This can include, but is not limited to, sampling events that require two or more workers to collect and log samples in close contact or work occurring in an interior space with limited ventilation and several workers present.

Lower Exposure Risk (Caution)

Lower exposure risk (caution) occupations/work activities are those that do not require close contact (within 6 feet for a cumulative total of 15 minutes or more over a 24-hour period) with other people. During these activities, there is limited contact (i.e., within 6 feet of) the general public or other workers. Workers in this category have minimal occupational contact with the public and other coworkers. This includes construction oversight that does not require close contact, sampling or gauging events performed by one worker and our remote workers as well as office workers who do not have frequent close contact with coworkers, clients, or the public.

6. CDC FULLY VACCINATED GUIDANCE

Vaccination is a vital tool to reduce the presence and severity of COVID-19 cases in the workplace and communities. Roux has recommended the vaccine for all employees. Should vaccines be required by local/state/client requirements Roux shall ensure our workforce shall comply with such requirement. Roux Human Resources shall collect information on vaccination status of employees who have been vaccinated to make informed decisions and ensure conformance with state/local requirements, as appropriate.

In general, employees shall be considered fully vaccinated:

- 2 weeks after their second dose in a 2-dose series, such as the Pfizer or Moderna vaccines, or
- 2 weeks after a single-dose vaccine, such as Johnson & Johnson's Janssen vaccine.

If you do not meet these requirements, regardless of age, you are not fully vaccinated and are asked to continue to take all precautions until you are fully vaccinated. CDC recommends that people remain up to date with their vaccines, which includes additional doses for individuals who are immunocompromised or booster doses at regular time points. Individuals who are moderately or severely immunocompromised should get an additional primary shot and a booster shot.

7. COVID-19 HEALTH SCREENING

7.1 Roux Employees

Depending on local/state/client requirements, Roux employees may self-attest to a COVID-19 Daily Health Questionnaire which is to be completed at home through a mobile application on scheduled workdays. The purpose of this program is to ensure business continuity as well as mitigate any potential exposure to our employees and others if it is determined employees are at-risk for contracting COVID-19. As part of this self-attestation, all employees are required to take their temperatures daily at home to confirm they do not have a fever (≥ 100.4). Employees who answer yes to any of these questions are instructed to contact their Office Manager and/or Department Head immediately and should not enter the office or go to a field site. Information shall be used to determine appropriate internal response in consultation with the Human Resources Director (HRD) and CHSD.

Below, you will find our COVID-19 Daily Health Questionnaire that all Roux employees are required to self-attest to **every scheduled workday by 9:30 AM.** If employees do not promptly fill out the questionnaire by the time listed above, there will be additional follow up by HR, H&S, and/or OMs.

According to the U.S. Centers for Disease Control and Prevention & the World Health Organization, COVID-19 Symptoms include:

- *Fever (≥100. 4°F) or chills*
- *Cough*
- *Shortness of breath or difficulty breathing*
- *Fatigue*
- *Muscle or body aches*
- *Headache*
- *New loss of taste or smell*
- *Sore throat*
- *Congestion or runny nose*
- *Nausea or vomiting*
- *Diarrhea*

Have you experienced any of the COVID-19 related symptoms noted above in the last 14 days? Please Note: We do not expect employees to answer "yes" to the symptoms question if these are symptoms you normally experience due to another condition or medication.

- *Yes*
- *No*

Have you been in close contact with someone who is suspected or confirmed to have COVID-19 or who is under investigation for COVID-19 within the last 14 days? * Close contact as defined by the CDC is being within 6 feet of someone who has COVID-19 for a cumulative total of 15 minutes or more over a 24-hour period.*

- *Yes*
- *No*

Have you traveled outside of the country, been on a cruise ship and/or traveled to areas within the United States which have state mandated travel restrictions in the last 14 days?

- *Yes*
- *No*

Have you tested positive for COVID-19 within the last 14 days?

- *Yes*
- *No*

7.2 Subcontractors

In an effort to mitigate the risk of transmission of COVID-19, Subcontractors who shall perform work onsite are required to attest to the fitness of their work crew on a daily basis. This requires each worker to self-assess by asking themselves the four questions listed in the section above and also contained within the Roux Subcontractor Work Crew COVID-19 Daily Health Attestation. If any crew member answers "Yes" to any of the questions, that worker is not to report to the field site and should seek proper medical advice in accordance with local, state and federal guidelines. In addition, the Sub-Contractor shall self-attest to vaccination status in order for the Field Team to ensure conformance with updated guidance for fully vaccinated individuals should state/local/client requirements allow. See Section 6. CDC Fully Vaccinated Guidance.

On a daily basis, the subcontractor supervisor must provide the Subcontractor Work Crew COVID-19 Daily Health Attestation complete with the names of all work crew fit to be on the Site for that day (i.e., who have answered "No" to all questions on the self-assessment) to Roux's Project Manager or Site Supervisor. The Subcontractor must notify Roux if there have been any "Yes" responses daily. Subcontractors shall not be required to provide the name or any other personal information of any employee who has answered "Yes" to any of the self-assessment questions, however, the Subcontractor should provide the date and times that the employee has been onsite in the prior 14 days. Records shall be maintained within the project files indicating health screening has been performed, records shall be retained for not less than 14 days following the date of submission. The Roux Subcontractor Work Crew COVID-19 Daily Health Check Attestation can be found within Appendix A.

8. SELF-ISOLATION & QUARANTINE

8.1 Self-Isolation

What if I am asked to self-isolate at home and when can I return from home isolation?

Depending on the situation, if you are COVID-19 positive or suspected to have COVID-19, employees may be required to self-isolate in their homes, as per CDC or local health department guidelines. Roux shall follow CDC guidance in areas where local/state requirements allow. The following table below outlines CDC isolation guidance.

Day 0 is your first day of symptoms or a positive viral test. Day 1 is the first full day after your symptoms developed or your test specimen was collected. If you have COVID-19 or have symptoms, isolate for at least 5 days.

IF YOU Tested positive for COVID-19 or have symptoms, regardless of vaccination status	**Stay home for at least 5 days** Stay home for 5 days and isolate from others in your home. Wear a well-fitted mask if you must be around others in your home.	**Ending isolation if you had symptoms** End isolation after 5 full days if you are fever-free for 24 hours (without the use of fever-reducing medication) and your symptoms are improving. **Ending isolation if you did NOT have symptoms** End isolation after at least 5 full days after your positive test. **If you were severely ill with COVID-19** You should isolate for at least 10 days. Consult your doctor before ending isolation.	**Take precautions until day 10** **Wear a mask** Wear a well-fitted mask for 10 full days any time you are around others inside your home or in public. Do not go to places where you are unable to wear a mask. **Avoid travel** **Avoid being around people who are at high risk**

8.2 Quarantine

Employees may be required to self-quarantine due to potential exposure with a suspected and/or confirmed COVID-19 positive individual as well as recent travel as per local/state guidelines. People in quarantine should stay home, separate themselves from others, monitor their health, and follow directions from their state or local health department.

8.2.1 Close Contact Quarantine

The following table below outlines CDC quarantine guidance. The date of your exposure is considered day 0. Day 1 is the first full day after your last contact with a person who has had COVID-19. Stay home and away from other people for at least 5 days.

IF YOU **Were exposed to COVID-19 and are NOT up-to-date on COVID-19 vaccinations**	**Quarantine for at least 5 days** **Stay home** Stay home and quarantine for at least 5 full days. Wear a well-fitted mask if you must be around others in your home. **Get tested** Even if you don't develop symptoms, get tested at least 5 days after you last had close contact with someone with COVID-19.	**After quarantine** **Watch for symptoms** Watch for symptoms until 10 days after you last had close contact with someone with COVID-19. **If you develop symptoms** Isolate immediately and get tested. Continue to stay home until you know the results. Wear a well-fitted mask around others.	**Take precautions until day 10** **Wear a mask** Wear a well-fitted mask for 10 full days any time you are around others inside your home or in public. Do not go to places where you are unable to wear a mask. **Avoid travel** **Avoid being around people who are at high risk**

IF YOU **Were exposed to COVID-19 and are up-to-date with vaccination OR had confirmed COVID-19 within the past 90 days (you tested positive using a viral test)**	**No quarantine** You do not need to stay home **unless** you develop symptoms. **Get tested** Even if you don't develop symptoms, it is recommended to get tested at least 5 days after you last had close contact with someone with COVID-19	**Watch for symptoms** Watch for symptoms until 10 days after you last had close contact with someone with COVID-19. **If you develop symptoms** Isolate immediately and get tested. Continue to stay home until you know the results. Wear a well-fitted mask around others.	**Take precautions until day 10** **Wear a mask** Wear a well-fitted mask for 10 full days any time you are around others inside your home or in public. Do not go to places where you are unable to wear a mask. **Avoid travel** **Avoid being around people who are at high risk**

8.2.2 Travel Related Quarantine/Testing

All travel out of state must be communicated with the OM and/or Department Head prior to departure. Please note, some federal/state/local entities require submissions of traveler health forms and potentially require additional testing for COVID-19. It is expected all Roux employees will comply with such federal/state/local travel requirements.

9. WORKPLACE CONTROLS

During the project planning phase, worksite evaluations shall be carried out by the PP and OM in consultation with the CHSD to determine risk exposure levels for work activities. If it is determined there is a high exposure risk level or higher, additional workplace controls shall be evaluated and implemented as required in addition to the basic infection prevention measures outlined below in Section 10. Additional workplace controls can include engineering controls (i.e., ventilation, physical barriers), administrative controls (i.e., minimizing contact between workers, rotating shifts, site specific training), and additional personal protective equipment (i.e., respiratory protection). If exposure risk cannot be mitigated, potential project postponement may be necessary at the discretion of the OM in consultation with the CHSD.

A Job Safety Analysis (JSA) has been developed and is provided in Appendix B, which summarizes and applies concepts within this guidance, including the infection prevention measures listed below. This JSA shall be required for all fieldwork in areas where there is community-based transmission of COVID-19.

10. INFECTION PREVENTION MEASURES

The following is basic infection prevention and personal hygiene practices which shall be implemented for all Roux field activities as well as in the office setting.

- ***Personal Hygiene***
  - Wash your hands often with soap and water for at least 20 seconds.
    - If soap and water are not available, use an alcohol-based sanitizer that contains at least 60% alcohol.
    - Key times to wash your hands include after blowing your nose, coughing or sneezing, after using the restroom, and before eating or preparing food.
  - Do not touch your eyes, face, nose and mouth with unwashed hands.
  - Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow.
  - Throw potentially contaminated items (e.g., used tissues) in the trash.

- ***Avoid Close Contact/Secondary Contact with People and Potentially Contaminated Surfaces***
  - Apply appropriate social distance (6+ feet), as appropriate.
  - Do not work in areas with limited ventilation with other Site workers (e.g., small work trailer which lacks HVAC system).
  - Morning tailgate/safety meetings are recommended to occur outside or in well ventilated work trailers.
  - Contact your lab/equipment vendor to confirm equipment is properly disinfected prior to being shipped.
  - Do not carpool with others unless all individuals are comfortable with traveling together.
  - For company owned vehicles limit sharing of vehicles with coworkers. If unable to limit sharing of company owned vehicles, properly clean vehicle before driving with a focus on commonly touched surfaces (e.g., steering wheels, shifters, buttons, etc.).
  - Use caution when using public restrooms, portable toilets. Use paper towel as a barrier when touching door handles and faucets.
- ***Cleaning and Disinfecting***
  - Clean high touched surfaces daily. Examples of high-touch surfaces include: counters, tables, doorknobs, handles, stair rails, desks, toilets, faucets, and sinks. In most situations, regular cleaning (at least once a day) is enough to sufficiently remove virus that may be on surfaces. However, if certain conditions apply, you may choose to disinfect after cleaning. When there is no confirmed or suspected COVID-19 cases known to have been in a space, cleaning once a day is usually enough to sufficiently remove virus that may be on surfaces and help maintain a healthy facility.
  - You may want to either clean more frequently or choose to disinfect in addition to cleaning in shared spaces if the space:
    - Is a high traffic area, with a large number of people,
    - Is poorly ventilated,
    - Does not provide access to handwashing or hand sanitizer, or
    - The space is occupied by individuals at increased risk for severe illness.

If a someone who tested or is presumed COVID-19 positive and has been in your facility within the last 24 hours, you should clean and disinfect the space. This will be done in consultation with the CHSD.

The following below outlines cleaning and disinfection protocols for specific types of surfaces as required. Please consult with the CHSD when developing site-specific cleaning and disinfection protocols.

- ***Hard (Non-porous) Surfaces***
  - If surfaces are dirty, they should be cleaned with a detergent/soap and water prior to disinfection.
  - Refer to the manufacturer's instructions to ensure safe and effective use of the product and wear appropriate personal protective equipment (e.g., gloves, safety glasses, face shield).
  - Many products require:
    - Keeping surface wet for a period of time (i.e., contact time).
      - Refer to manufacturer's instructions outlining adequate contact time.
    - Precautions such as wearing gloves and making sure you have good ventilation during use of the product.
  - Disposable gloves should be removed aseptically and discarded after cleaning. Wash hands immediately following removal of gloves. Refer to Appendix C for how to remove gloves aseptically.

- If products on EPA List N: Disinfectants for Coronavirus (COVID-19) are not available, bleach solutions can be used if appropriate for the surface and will be effective against coronaviruses when properly diluted.
  - Most household bleach contains 5%–9% sodium hypochlorite. Do not use a bleach product if the percentage is not in this range or is not specified, such as some types of laundry bleach or splash-less bleach as these are not appropriate for disinfection.
  - Follow the directions on the bleach bottle for preparing a diluted bleach solution. If your bottle does not have directions, you can make a bleach solution for disinfecting by mixing:
    - 5 tablespoons (1/3 cup) of bleach per gallon of room temperature water; OR
    - 4 teaspoons of bleach per quart of room temperature water.
  - Follow the manufacturer's application instructions for the surface. If instructions are not available, leave the diluted bleach solution on the surface for at least 1 minute before removing or wiping. This is known as the "contact time" for disinfection. The surface should remain visibly wet during the contact time.
  - Ensure proper ventilation during and after application (for example, open windows).
  - Never mix household bleach (or any disinfectants) with any other cleaners or disinfectants. This can cause vapors that may be very dangerous to breathe in.
  - Make a new diluted bleach solution daily. Bleach solutions will not be as effective after being mixed with water for over 24 hours. Products with EPA-approved emerging viral pathogen claims are expected to be effective against COVID-19. Follow the manufacturer's instructions for all cleaning and disinfecting products (e.g., concentration, application method and contact time, etc.).

- ***Soft (Porous) Surfaces***
  - For soft (porous) surfaces, remove visible contamination if present and clean with appropriate cleaners indicated for use on the surfaces. After cleaning:
    - Launder items as appropriate in accordance with the manufacturer's instructions. If possible, launder using the warmest appropriate water setting for the item and dry items completely; or
    - Use products with the EPA-approved emerging viral pathogens that claim they are suitable for porous surfaces.

- ***Electronics***
  - For electronics such as tablets, touch screens, keyboards, remote controls, etc. remove visible contamination if present.
    - Follow the manufacturer's instructions for all cleaning and disinfection products.
    - Consider use of wipeable covers for electronics.
    - If no manufacturer guidance is available, consider the use of alcohol-based wipes or sprays containing at least 70% alcohol to disinfect touch screens. Dry surfaces thoroughly to avoid pooling of liquids.

- ***Linens, Clothing, and Other Items that Go in the Laundry***
  - Although it is unlikely field clothing would become potentially contaminated with COVID-19, it is recommended that field staff regularly launder field clothing following any field event upon returning home.
  - In order to minimize the possibility of dispersing the virus from potentially contaminated clothing, do not shake dirty laundry.
  - Wash items as appropriate in accordance with the manufacturer's instructions. If possible, launder items using the warmest appropriate water setting for the items and dry items completely.
  - Clean and disinfect hampers or other containers used for transporting laundry according to guidance listed above.

- ***Office/Site Specific-Cleaning and Disinfection Protocols***
    - Each office and long-term field site shall develop internal cleaning and disinfecting practices, which can be broken into three categories: routine cleaning; enhanced cleaning and disinfecting; and deep cleaning and disinfecting.
    - In the instance there is someone who is suspected or confirmed positive for COVID-19 and has worked at the office or field site within the last 24 hours, deep cleaning and disinfecting shall be considered. The CHSD shall work with the OM and Office Health and Safety Manager (OHSM) to evaluate site-specific measures that shall be carried out prior to deep cleaning and disinfecting. If more than 24 hours have passed since the person who is sick or diagnosed with COVID-19 has been in the space, cleaning shall be carried out. You may choose to also disinfect depending on certain conditions and in consultation with the CHSD.
    - If deep cleaning and disinfection is carried out the following will be considered:
        - Closing off all areas potentially affected and wait at least several hours before you clean and disinfect.
        - Areas should remain closed off until cleaning and disinfecting takes place; if able, ventilation shall be increased in the space (e.g., opening doors, windows, increasing CFM).

11. FACE COVERINGS

The CDC recommends the use of face coverings/masks in public settings where other social distancing measures are difficult to maintain. Masks are required on planes, buses, trains and other forms of public transportation traveling into, within, or out of the United States and in U.S. indoor transportation hubs such as airports and stations. The use of face coverings is to supplement and NOT replace the existing practices outlined above.

Based on existing studies and on-going recommendations and/or requirements from federal, state, and local entities, Roux is recommending the use of face coverings, when appropriate. Appropriate use is defined when local authorities or clients require the use of face coverings in conjunction with established social distancing, or if an employee elects to use a cloth covering on their own accord. Roux will provide appropriate face coverings that shall meet the basic requirements outlined by the CDC guidance.

Face Coverings (i.e., masks) should:

- Have two or more layers of washable, breathable fabric;
- Completely cover the nose and mouth;
- Fit snugly against the sides of the face and not have any gaps; and
- Have a nose wire to prevent air from leaking out of the top of the mask.

When donning and doffing the face covering, individuals should avoid touching their eyes, nose, and mouth. Following removal of the face covering, employees should wash their hands immediately using the guidelines described in Section 10 Infection Prevention Measures-Personal Hygiene above. Face coverings should be routinely washed depending on the frequency of use.

APPENDIX A

Roux Subcontractor Work Crew
COVID-19 Daily Health Screening Questionnaire

Subcontractor Work Crew
COVID-19 Daily Health Attestation

Date:	
Company Name:	
Supervisor Name:	Signature:
Project Name:	
Site Address:	
Number of Workers on site:	

Prior to entry onto a field site, the following questions shall be asked by the Subcontractor Supervisor to their work crew. **Subcontractors and Field Teams shall self-attest to vaccination status in order to ensure compliance with state/local guidance for fully vaccinated and unvaccinated individuals.**

It is preferred this questionnaire is completed for each individual prior to their arrival at the field site. If the answer to any of these questions is YES, the worker is not to report to the field site and seek proper medical advice, in accordance with CDC Guidelines. **The Subcontractor Supervisor must provide this form on a daily basis to the Roux primary contact for the project and notify Roux of any YES responses.**

1. Have you experienced any signs/symptoms of COVID-19 such as fever (≥100.4°F), cough, shortness of breath, chills, fatigue, muscle/body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea/vomiting or diarrhea in the last 5 days?

2. Have you been in close contact* with someone who is suspected or confirmed to have COVID-19 or who is under investigation for COVID-19 within the last 5 days?

*Close contact as defined by the CDC is being within 6 feet of someone who has COVID-19 for a cumulative total of 15 minutes or more over a 24-hour period. Those who are up to date on COVID-19 vaccinations or had confirmed COVID-19 within the past 90 days (you tested positive using a viral test) you do not need to quarantine.

3. Have you traveled outside of the country, been on a cruise ship and/or traveled to areas within the United States which have state mandated travel restrictions in the last 5 days?

4. Have you tested positive for COVID-19 within the last 5 days?

Please list the crew member's names on site for the day.

1.	8.
2.	9.
3.	10.
4.	11.
5.	12.
6.	13.
7.	14.

APPENDIX B

Job Safety Analysis-Working in Areas Affected by COVID-19

JOB SAFETY ANALYSIS	Ctrl. No. CVD-19	DATE: 01/10/2022	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**Fieldwork**	**Working in Areas Affected by Coronavirus**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Kristina DeLuca	Health and Safety Specialist	Brian Hobbs	CHSD

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES – Leather/cut-resistant in field and nitrile as needed
☒ HARD HAT – In field	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING – High visibility vest in field	☐ OTHER
☒ SAFETY GLASSES – In field	☒ SAFETY SHOES – Steel/composite toe in fie		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Face covering/mask, nitrile gloves, hand soap, water source, hand sanitizer, disinfectant spray and disinfectant wipes.

Commitment to Safety – All personnel onsite will actively participate in SPSA performance by verbalizing SPSAs throughout the day.

SOCIAL DISTANCING: Maintain 6' of distance between yourself and all other people at all times. If you do not believe the scope of work can be conducted while maintaining this distance, contact your Project Manager immediately.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Project Preplanning	N/A	• Review and follow COVID-19 CDC, Roux, Client and local orders/protocols. • Ensure all workers are fit for duty - anyone feeling sick should remain at home even if symptoms do not align with COVID-19. If a worker has been in contact with someone potentially positive or positive for COVID-19, contact your Office Manager. • Determine PPE needs and ensure adequate supply of disinfectant wipes/spray, soap and water or hand sanitizer at Site. Due to high demands and limited supply, plan ahead. • Use the minimum number of employees necessary to safely complete the work.
2. Mobilization	**Exposure:** Becoming infected or infecting co-workers	**Personal/Rental/Roux Owned Vehicle** • Avoid carpooling, unless all individuals are up to date on vaccinations. • Verify workers/other people are not approaching vehicle prior to exiting the vehicle. Maintain 6' of distance from general public, as appropriate. **Public Transportation** • Public transit should not be used unless absolutely necessary. Consider renting a car rather than taking public transit. If public transit is required, wear appropriate face covering/mask and apply social distancing (6 ft). Wash hands or use hand sanitizer immediately after. **Hotel Stay (Refer to COVID-19 H&S Guidance for more info)** • If a hotel stay is deemed necessary for the given field work, ensure that you clean your room upon initial arrival. • Place the "Do Not Disturb" placard on the room while away and limit housekeeping services to the extent feasible during your stay to minimize the reintroduction and spread of the virus from others.. Wash hands or use hand sanitizer often.
3. Tailgate Meeting	**Exposure:** Becoming infected or infecting co-workers	• Perform outside or indoors in areas with ample ventilation. • If unvaccinated, maintain at least a 6+ ft distance between you and others. • Discuss primary infection prevention measures listed below. • Discuss COVID-19 symptoms with coworkers and subcontractors to ensure fitness for duty. Anyone exhibiting signs or symptoms should be instructed to leave the Site, contact your Project Manager.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards, energy source; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

4. Site Activities	**Exposure:** Becoming infected or infecting co-workers	• Coordinate field activities at the beginning of the day (i.e. Tailgate meeting) to minimize time spent in crowded spaces or overlap while completing job tasks. • Don face coverings as appropriate. • Apply social distancing (6+ ft) when interacting with others if unvaccinated. If anyone comes within 6 ft of you while conducting work and your work prevents you from moving away, politely ask them to move back. If others are unable to move from your space, stop work and leave area. • Minimize shaking hands or touching others. • Minimize sharing of equipment or other items with co-workers and subcontractors unless wearing appropriate PPE (e.g. nitrile gloves), as appropriate. • If anyone is experiencing COVID-19 signs or symptoms in your vicinity, stop work and leave the area. • Do not work in areas with limited ventilation with others. • Cover your mouth and nose with tissue or paper towel or with your elbow when coughing or sneezing and wash hands or use hand sanitizer immediately after. If sick contact SHSO/PM and leave Site immediately. • Clean work surfaces/areas with approved cleaners you're responsible for (ex: desk, office doorknob, computer, etc.) at least daily. • Avoid public spaces and going out to eat by bringing your own lunch to the Site. If performing work in high density urban areas, it is recommended all food must be consumed at or in your vehicle or within designated work trailer. Wash hands or use hand sanitizer before eating and immediately after.

Primary Infection Prevention Measures

- Wash your hands often with soap and water for at least 20 seconds.
  - If soap and water are not available, use an alcohol-based sanitizer that contains at least 60% alcohol. Key times to wash hands include after blowing your nose, coughing or sneezing, after using the restroom, and before eating or preparing food.
- Do not touch your eyes, face, nose and mouth with unwashed hands.
- Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. Throw potentially contaminated items (e.g. used tissues) in the trash.
- Avoid close contact/secondary contact with people and potentially contaminated surfaces.
  - Apply appropriate social distance (6+ feet).
  - Minimize handshaking/touching others and use caution when accessing public spaces.
- Clean frequently touched surfaces daily. Commonly touched items can include but are not limited to tables, doorknobs, light switches, countertops, handles, desks, phones, keyboard, toilets, sinks and field equipment. If surfaces are dirty, they should be cleaned with soap and water prior to disinfection. If surface cannot be cleaned/disinfected, then wash hands or use sanitizer as soon as possible.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

APPENDIX C

How to Remove Gloves

How to Remove Gloves

To protect yourself, use the following steps to take off gloves

1

Grasp the outside of one glove at the wrist. Do not touch your bare skin.

2

Peel the glove away from your body, pulling it inside out.

3

Hold the glove you just removed in your gloved hand.

4

Peel off the second glove by putting your fingers inside the glove at the top of your wrist.

5

Turn the second glove inside out while pulling it away from your body, leaving the first glove inside the second.

6

Dispose of the gloves safely. Do not reuse the gloves.

7

Clean your hands immediately after removing gloves.

APPENDIX H

Community Air Monitoring Plan

Community Air Monitoring Plan

Former FO Pierce Company
2-33 50th Ave
Block 17 Lot 1
Long Island City, New York

October 11, 2021

Prepared for:

50th & 5th LIC LLC
184 North 8th Street
Brooklyn, New York 11211

Prepared by:

Roux Environmental Engineering and Geology, D.P.C.
209 Shafter Street
Islandia, New York 11749

2887.0004Y120/CV

Table of Contents

Table

Appendix

1. Introduction

Roux Environmental Engineering and Geology, D.P.C. (Roux) on behalf of 50th & 5th LIC LLC (the "Volunteer"), have developed a project specific Community Air Monitoring Plan (CAMP) to implement real time monitoring at the Site, which occupies Tax Lot 1 of Tax Block 17, during remedial action (RA) activities.

The monitoring program will be implemented at all times during which earth disturbance activities are occurring. The CAMP is designed to provide a measure of protection for the downwind community and on-Site workers not directly involved with the subject work activities from potential airborne contaminant releases as a direct result of RA activities. This plan is consistent with the New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan guidance document.

The specifics of the CAMP are presented in the following four (4) sections:

- 1.1 VOC Monitoring Approach
- 1.2 Particulate Monitoring Approach
- 1.3 Meteorological Monitoring Approach
- 1.4 Available Suppression Techniques

1.1 VOC Monitoring Approach

Total VOC concentrations in air will be monitored continuously at a location downwind of the excavation activities during all ground intrusive activities. An upwind monitoring station will be set up adjacent to where RA activities are occurring. The VOC monitoring equipment will be located at temporary monitoring stations that will be established daily based on Site logistics and weather conditions. The monitoring work will be conducted using MiniRAE 3000 (or equivalent) portable VOC monitors, or similar type monitors, for all VOC monitoring. The equipment will be calibrated at least once daily using isobutylene as the calibration gas. One (1) upwind and one (1) downwind monitor will be deployed each day. Each monitoring unit is equipped with an audible alarm to indicate exceedance of the action levels (as defined below and summarized in Table 1).

The equipment is capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total VOCs at the downwind perimeter of the Site 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.
- If the ambient air concentration of total VOCs at the downwind perimeter of the Site persists at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of VOCs identified, suppression techniques employed to abate emissions, and monitoring continued. After these steps, work activities can resume if the total organic vapor level at the Site perimeter is below 5 ppm over the background concentration for the 15-minute average. If levels are in excess of 25 ppm above background, identified contributing ground-intrusive activities will be halted and vapor suppression techniques will be evaluated and modified until monitoring indicates VOC levels at the Site perimeter are below 5 ppm over background. Once VOC levels are below 5 ppm at the Site perimeter, work will resume with continued monitoring.
- All 15-minute readings will be recorded and be available for State Regulator (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will be recorded. If an exceedance of the action level occurs, an Action Limit Report (ALR) will be

completed, identifying the monitoring device location, the measured VOC level, the activity causing the exceedance, meteorological conditions, and the corrective actions taken, as provided in Appendix A. Additionally, the NYSDEC and NYSDOH will be notified within 24 hours of the VOC ALR generation. Daily monitoring equipment locations and meteorological conditions will also be documented on the daily CAMP Monitoring Location Plan. All documentation will be kept on file at the Site.

1.2 Particulate Monitoring, Response Levels and Actions

Particulate concentrations will be monitored continuously at temporary particulate monitoring stations set up at the sidewalk at upwind and downwind locations. The particulate monitoring will 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 levels (as defined below and summarized in Table 1). Monitoring equipment will be MIE Data Ram monitors or equivalent. A minimum of one (1) upwind and one (1) downwind monitor will be deployed each day, equipped with an omni-directional sampling inlet and a PM-10 sample head. The data logging averaging period will be set to 15-minutes with time and date stamp recording. Alarm averaging will be set at 90 micrograms per cubic meter ($\mu g/m^3$) per 15-minute period. This setting will allow proactive evaluation of Site conditions prior to reaching Action Levels of 100 $\mu g/m^3$ above background. The equipment will be outfitted with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. The monitoring will be used to compare values to the following:

- If the downwind PM-10 particulate level is 100 µg/m3 greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the Site, 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 µg/m3 above the upwind level and provided that no visible dust is migrating from the Site.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/m3 above the upwind level, work must be stopped, a re-evaluation of activities initiated, and dust suppression techniques modified. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m3 of the upwind level and in preventing visible dust migration.

All 15-minute readings will be recorded and be available for State Regulator (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will be recorded. If an exceedance of the action level occurs, an ALR will be completed, identifying the monitoring device location, the measured particulate concentration, the activity causing the exceedance, meteorological conditions, and the corrective actions taken, as provided in Appendix A. Daily monitoring equipment locations will also be documented on the daily CAMP Monitoring Location Plan. All documentation will be kept on file at the Site.

1.3 Meteorological Monitoring

Wind speed (estimated) and wind direction, will be approximated based on field observations of onsite personnel. Meteorological data consisting of temperature, barometric pressure, and relative humidity will be recorded in the field book based upon publically available information from local weather stations.

1.4 Available Suppression Techniques

Odor Control

Due to the nature of the project, with intrusive activities occurring, the potential for generation of nuisance odors and the need for odor control may be necessary. If nuisance odors are identified, 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 all other complaints about the project.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (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) use of chemical odorants in spray or misting systems; and, (e) use of staff to monitor odors in surrounding neighborhoods.

Dust Control

Due to the nature of the project, the potential for generation of nuisance dust and the need for dust control may be necessary. Dust suppression will be achieved through the use of water for wetting excavation areas, if required. Water will be available on-site at suitable supply and pressure for use in dust control.

1.5 Reporting

All recorded monitoring data will be downloaded, and field logged periodically, including action limit reports (if any) and daily CAMP monitoring location plans. All records will be maintained onsite and available for NYSDEC/NYSDOH review. A summary of CAMP findings, including excursions, will be provided in the Daily Reports. All CAMP monitoring records will be included in the overall Final Engineering Report that will be submitted to the NYSDEC and NYSDOH and will include all of the CAMP data collected, daily monitoring station location maps, and copies of the ALRs (if any). If an ALR is generated due to VOC exceedances, the NYSDEC and NYSDOH will be notified within 24 hours of the exceedance.

TABLE

Action Limit Summary for VOCs and Particulates

Table 1. Action Limit Summary for VOCs and Particulates, 2-33 50th Avenue, Long Island City, NY

Contaminant	Downwind Action Levels*	Action/Response
Volatile Organic Compounds (VOCs) (Monitoring Via Photoionization Detector and Odor Observation)	< 5 ppm	1. Resume work with continuing monitoring.
	5 ppm < level < 25 ppm	1. Work activities must be temporarily halted, source vapors must be identified, suppression techniques employed to abate emissions and monitoring continued. 2. After these steps, if VOC levels (200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or structure, whichever is less) is below 5 ppm over background, resume work.
	> 25 ppm	1. Identified contributing ground intrusive activities must be halted and vapor suppression techniques must be evaluated and modified until monitoring indicates VOC levels below the action level. 2. After these steps, if VOC levels (half the distance to the nearest potential receptor or structure) are below 5 ppm over background, resume work.
Particulates (Monitoring Via Particulate Meter and Observation)	< 100 ug/m^3	1. If dust is observed leaving the work area, then dust control techniques must be implemented or additional controls used.
	100 ug/m3 < level < 150 ug/m^3	1. Employ dust suppression techniques. 2. Work may continue with dust suppression techniques provided that downwind PM-10 particulate concentration do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
	> 150 ug/m^3	1. STOP work 2. Re-evaluate activities, modify dust suppression techniques. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

* Instantaneous readings above background. Particulate readings are based on the respirable (PM-10) fraction. Background readings are taken at upwind locations relative to Work Areas or Exclusion Zones.

APPENDIX A

Action Limit Report

ACTION LIMIT REPORT

Project Location: 2-33 50th Avenue, Long Island City, NY 11101
Tax Block 17 Lot 1

Date: _____ Time: _____

Name: _____

Contaminant: PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

DOWNWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

UPWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

BACKGROUND CORRECTED LEVELS

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

ACTIVITY DESCRIPTION

CORRECTIVE ACTION TAKEN

APPENDIX F

Quality Assurance Project Plan/Field Sampling Plan

Quality Assurance Project Plan/ Field Sampling Plan

Former FO Pierce Company
2-33 50th Avenue
Tax Block 17 Lot 1
Long Island City, New York

July 17, 2023

Prepared for:

50th & 5th LIC LLC
184 North 8th Street
Brooklyn, New York 11211

Prepared by:

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2887.0004Y163/CV

Table of Contents

Tables

Figures

Appendices

1. Introduction

Roux Environmental Engineering and Geology, D.P.C. (Roux), on behalf of 50th & 5th LIC LLC (referred to herein as the Volunteer), has prepared this Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP) to describe the measures that will be taken to ensure the data generated during the Site Management Plan (SMP) for the Former FO Pierce Company located at 2-33 50th Avenue, Long Island City, New York, occupying Tax Block 17, Lot 1 (Site, Figures 1 and 2) are of quality sufficient to meet project-specific data quality objectives (DQOs). This QAPP/FSP also includes field sampling procedures.

This QAPP/FSP was prepared in accordance with the guidance provided in NYSDEC Technical Guidance DER-10 Technical Guidance for Site Investigation and Remediation (DER-10), the NYSDEC BCP Guide, and the United States Environmental Protection Agency's (USEPA's) Guidance for the Data Quality Objectives Process (EPA QA/G 4).

1.1 Purpose

The QAPP/FSP describes in detail the field sampling and quality assurance/quality control (QA/QC) methods to be used during soil, soil vapor, and groundwater sampling tasks performed during the RA.

This QAPP/FSP was prepared in accordance with the NYSDEC's DER-10 and provides guidelines and procedures to be followed by field personnel during performance of sampling during the RA. Information contained in this QAPP/FSP relates to:

- Sampling objectives (Section 2);
- Project organization (Section 3);
- Sample media, sampling locations, analytical suites, sampling frequencies, and laboratory analysis (Section 4);
- Field sampling procedures (Section 5);
- Sample handling, sample analysis, and quality assurance/quality control (Section 6); and
- Site control procedures and decontamination (Section 7).

2. Sampling Objectives

The sampling program is designed to meet the data quality objectives (DQOs) set forth in the DER-10. Specifically, analytical parameters selected for each sample, as described in Section 4, are comprehensive, and are intended to meet the following objectives:

- Analyze endpoint documentation samples;
- Analyze soil designated for offsite disposal for parameters required by the selected disposal facility;
- Analyze offsite backfill/on-Site reuse soil to evaluate its suitability for use as backfill
- Analyze groundwater samples collected as part of the groundwater monitoring plan for the Site

Sampling procedures are discussed in Section 5 of this QAPP/FSP. A discussion of the DQOs and quality assurance/quality control is provided in Section 6.

3. Project Organization

A general and generic summary of the overall management structure and responsibilities of project team members are presented below. Professional profiles for the team are provided in Appendix A.

Project Principal

Mr. Craig Werle, P.G., of Roux will serve as Project Principal. The Project Principal is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the remediation.

Remedial Engineer

The Remedial Engineer for this project will be Mr. Charles McGuckin, P.E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the RA and future remedial program for the Site. The Remedial Engineer will certify in the Final Engineering Report (FER) that the remediation activities were observed by qualified environmental professionals under supervision as well as any other relevant provisions of ECL 27-1419 have been achieved in full conformance with the RAWP.

Project Manager

Alexander Policastro of Roux will serve as Project Manager. The Project Manager is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the work. 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.

Field Team Leader

The Field Team Leader is TBD. The Field Team Leader bears the responsibility for the successful execution of the field program. The Field Team Leader will direct the activities of the technical staff in the field, as well as 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

Laboratory analysis will be completed by Alpha Analytical Laboratories of Westborough, MA, and Mansfield, MA, NYSDOH Environmental Laboratory Accreditation Program (ELAP)-certified laboratories (11148 and 11627, respectively). The Laboratory Project Manager is Jennifer Byrnes. The Laboratory Project Manager will be determined prior to the start of the Work. The Laboratory Project Manager is 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 an acceptable laboratory report is prepared and submitted. The Laboratory Project Manager reports to the Field Team Leader.

Quality Assurance Officer

Robert Kovacs of Roux will serve as the Quality Assurance Officer (QAO) for this project. The QAO is responsible for conducting reviews, inspections, and audits to ensure the data collection is conducted in accordance with the QAPP/FSP. The QAO's responsibilities range from ensuring effective field equipment decontamination procedures and proper sample collection to the review of all laboratory analytical data for completeness and usefulness. The QAO reports to the Project Manager and makes independent recommendations to the Field Team Leader.

4. Sample Media, Locations, Analytical Suites, and Frequency

The media to be sampled during future activities on-Site may include soil and backfill materials. A summary of field and laboratory quality control sampling frequencies is presented in Table 1. Sample preservations, holding times, and containers for environmental samples are presented in Table 2. Specifics regarding the collection of samples at each location and for each task are provided in Section 5 of this QAPP/FSP.

4.1 Documentation Soil Sampling

Documentation samples include the proposed samples to be collected during future construction. The proposed samples to be collected are described below.

Bottom Sampling

If required for any future excavation work in the Track 4 Restricted Residential portions of the Site, bottom documentation sampling will be conducted at a frequency of one sample per approximately 900 square feet of excavation area. The frequency of bottom sampling proposed for this alternative is in accordance with guidance provided in NYSDEC DER-10 5.4 for excavations 20 to 300 feet in perimeter.

Sidewall Sampling

If required for any future excavation work in the Track 4 Restricted Residential portions of the Site, sidewall sampling will be conducted at a frequency of one sample per 30 linear feet of sidewall. The sidewall samples will be biased toward any observed impacts (i.e., staining, odor, elevated photoionization detector [PID] readings). If no impacts are observed, the sidewall samples will be collected at half the excavation depth). The frequency of sidewall sampling proposed for this alternative is consistent with guidance provided in NYSDEC DER-10 5.4.

Analytical Sampling Parameters

The bottom and sidewall documentation samples will be tested for the TCL/Part 375 plus 30/ TAL (TCL + 30/TAL) list of parameters including:

- TCL/Part 375 VOC + 10 Tentatively identified compounds (TICs);
- TCL/Part 375 Base neutral acids (BNA)/SVOCs + 20 TICs;
- TCL/Part 375 Pesticides;
- TCL/Part 375 Herbicides;
- TCL/Part 375 PCBs;
- TAL/Part 375 Metals (including hexavalent chromium);
- Total Cyanide; and
- Emerging Contaminants *

  *ECs list includes 1,4-Dioxane as well as the 40 Per- and Polyfluoroalkyl Substances (PFAS) listed in the most recent November 2022 NYSDEC guidance *Sampling, Analysis, and Assessment of Per-and Polufluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs* (NYSDEC November 2022 Guidance), included as an attachment to this QAPP/FSP. 1,4-Dioxane in soil will be analyzed by USEPA Method 8270D. PFAS in soil will be analyzed by Draft USEPA Method 1633. The 40 PFAS are shown in the table below:

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per-and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

4.2 Offsite Backfill/On-Site Reuse Soil Sampling

For offsite fill/on-Site reuse soil materials requiring chemical testing, the following samples shall be collected:

- One sample for pre-qualification chemical testing at the source location, including the following:
  1. Chemical testing shall be performed at a minimum for the parameters listed in Table 375-6.8(b) of the latest revision of Part 375. Samples will be analyzed by the following analytical methods: Herbicides by USEPA method SW-846 8151A; Pesticides and PCBs by USEPA methods SW-846 8081B/8082A; VOCs by USEPA method SW-846 8260C; SVOCs by USEPA method SW-846 8270D; Arsenic, barium, beryllium, cadmium, copper, cyanide, lead, manganese, nickel, selenium, silver, and zinc by USEPA method SW-846 6010D/6010C; Total mercury by USEPA method SW-846 7471B; Total chromium, hexavalent chromium, and trivalent chromium by USEPA method SW-846 7196A; 1,4-Dioxane by USEPA method 8270D; and Per- and Polyfluoroalkyl Substances (PFAS) by Draft USEPA Method 1633.
  2. Backfill/on-Site reuse soil materials excluding those materials that do not require sampling as described below, shall meet criteria presented in Section 2.

3. Backfill/on-Site reuse soil materials that exceed the criteria presented in Section 2. shall not be imported to the Site without prior approval of the NYSDEC.
4. The backfill/on-Site reuse soil material will be free of extraneous debris or solid waste.
5. If the NYSDEC agrees that the material originated from a virgin source, then a minimum of one sample (i.e., the pre-qualification sample) will be collected and analyzed per source.

- If the source is not virgin, the sampling frequency will comply with DER-10 Table 5.4(e)10 shown below, PFAs must be sampled at the same frequency as SVOCs:

Table 5.4(e)10
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➢ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

The source of the offsite backfill/on-Site reuse soil must be documented by the supplier, including the location where the backfill/on-Site reuse soil was obtained and a brief history of the site that is the source of the backfill.

Samples of offsite backfill/on-Site reuse soil will be analyzed for the following parameters:

- Herbicides by USEPA method SW-846 8151A.
- Pesticides and PCBs by USEPA methods SW-846 8081B/8082A.
- VOCs by USEPA method SW-846 8260C.
- SVOCs by USEPA method SW-846 8270D.
- Arsenic, barium, beryllium, cadmium, copper, cyanide, lead, manganese, nickel, selenium, silver, and zinc by USEPA method SW-846 6010D/6010C.
- Total mercury by USEPA method SW-846 7471B.
- Total chromium, hexavalent chromium, and trivalent chromium by USEPA method SW-846 7196A.
- 1,4-Dioxane by USEPA method 8270D.
- Per- and Polyfluoroalkyl Substances (PFAS) by Draft USEPA Method 1633.

The parameters to be sampled are listed on Table 375-6.8(b) of the latest revision of Part 375. QA/QC samples are not required for backfill/on-Site reuse soil samples. All PFAS compounds, listed above, in soil will be analyzed and reported to 0.5 microgram per kilogram (ug/kg). 1,4-Dioxane will be analyzed and reported to 0.1 milligram per kilogram (mg/kg).

The following materials may be imported, without chemical testing, to be used as backfill beneath pavement, buildings or as part of the site cover, provided that it contains less than 10 percent by weight material that would pass through a size 100 sieve and consists of:

- Gravel, rock or stone, consisting of virgin material from a permitted mine or quarry; or
- Recycled concrete or brick from a NYSDEC registered construction and demolition debris processing facility if the material conforms to the requirements of Section 304 of the 2002 New York State Department of Transportation Standard Construction and Materials Volume 1.

4.3 Groundwater Sampling

Groundwater sampling will be conducted as part of the groundwater monitoring plan for the Site. The well locations are meant to provide coverage of the post remedial groundwater conditions throughout the site following shutdown of the construction dewatering influence and recharge of ambient groundwater to the pre-dewatering elevation. The groundwater monitoring plan calls for the installation of seven monitoring wells, four monitoring wells to cover the Track 1 portions of the site, and three monitoring wells to cover the Track 4 portion of the site while maintaining proximity to the areas of concern. All proposed well locations are shown on Figure 2 and groundwater sampling procedures are outlined below in Section 5.3.

Groundwater samples will be collected from the monitoring wells and submitted for laboratory analysis for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total and dissolved metals and compared against Ambient Water-Quality Standards and Guidance Values (AWQSGV). Field parameters (e.g., pH, dissolved oxygen, oxidation-reduction potential [ORP], etc.) will also be collected using a water quality meter during purging prior to sample collection.

5. Field Sampling Procedures

This section provides a detailed discussion of the field procedures to be used during sampling of the various media being evaluated (i.e., soil and backfill material). Additional details regarding sampling procedures and protocols are described in Roux's relevant Standard Operating Procedures (SOPs), which are provided in Appendix B.

5.1 Soil Sampling

Details for the collection of soil samples is provided below. Additional necessary precautions will be taken when sampling for ECs in the field, incuding but not limited to:

- Using the proper field clothing or personal protective equipment (i.e., no materials will contain Gore-Tex or Tyvek);
- Avoid sampling equipment components/containers making contact with aluminum foil, low density polyethylene (LDPE), glass, or polytetrafluoroethylene materials;
- Following PFAS field sampling guidelines (i.e., using sampling materials made from high density polyethylene [HDPE], silicon, or stainless steel and avoid using equipment containing Teflon and using sharpies, permanent markers, adhesives, and waterproof/plastic clipboards and notebooks); and
- Utilizing regular ice cubes for sample presevation and only Alconox for decontamination.

5.1.1 Documentation Sampling

Documentation soil samples will be observed for lithology and evidence of contamination (e.g., staining, odors, and/or visible free product) and placed immediately thereafter into large Ziploc® bags for ecording headspace using a PID. After a minimum of 15 minutes for equilibration with the headspace in the Ziploc® bag, each sample will be screened for organic vapors using a PID equipped with a 10.6 eV lamp. Samples for possible VOC analysis will be placed in a laboratory-supplied jar or encore sampler prior to screening, due to the potential for loss of VOCs through volatilization. These samples will be placed in the laboratory-supplied containers and shipped to the laboratory under chain of custody procedures in accordance with Roux's SOPs in Appendix B.

5.2 Offsite Backfill/On-Site Reuse Soil Sampling

All imported backfill/on-Site reuse soil material samples will be collected using pre-cleaned stainless steel sampling tools (i.e., trowels, spatulas, etc.) or new Ziploc® bags. As noted above, waste characterization samples will be collected as required by the selected disposal facility. In general, where composite samples are required for waste characterization or offsite fill/on-Site reuse soil material samples, composite samples will be collected from a minimum of three locations across the stockpiled materials. The exception is for VOC samples, which will be collected as grab samples.

5.3 Monitoring Well Installation and Groundwater Sampling

Monitoring wells will be installed and constructed of 2" PVC with 10 feet of screen, 20 slot, set 8 ft below the water table, and 2 feet above the water table at each location. The groundwater level is anticipated to be encountered at +1.21' elevation. After installation, the annular space surrounding the well screen will be filled with sand with a 2-foot grout seal and a flush mount steel monitoring well cover will be installed at grade. A Geoprobe 420M and a Geoprobe 610 handcart rig will be utilized to complete the well installations.

The wells will be completed using locking well plugs, and flush mounted, bolt down, watertight, manhole covers cemented into place.

Groundwater samples from the permanent monitoring wells will be collected no sooner than one (1) week following development of the wells. Prior to sampling, depth to water will be measured at each well using an electronic water level meter with an accuracy of +/ 0.01 feet. All wells will then be purged and sampled using a low-flow method. Purging and sampling will be performed consistent with USEPA low-flow sampling requirements. Additional details for the collection of groundwater samples are included in the Roux SOPs in Appendix B. All groundwater samples will be collected and placed in the laboratory-supplied containers and shipped to the laboratory on ice under chain of custody procedures in accordance with Roux's SOPs.

6. 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, shipping procedures, and QA/QC.

6.1 Field Sample Handling

A discussion of the proposed number and types of samples to be collected during each task, as well as the analyses to be performed, can be found in Section 4 of this QAPP/FSP. The types of containers, volumes, and preservation techniques for the aforementioned testing parameters are presented in Table 2.

6.2 Sample Custody Documentation

The purpose of documenting sample custody is to ensure 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 (and return of unused sample portions, if applicable).

Each individual collecting samples is personally responsible for the care and custody of the samples. All sample labels should 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 offsite for analysis must be accompanied by a properly completed chain of custody form. 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 shipment and dispatched to the appropriate laboratory for analysis 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.

6.3 Sample Shipment

Laboratory analysis will be completed by Alpha Analytical Laboratories of Westborough, Massachusetts, and Mansfield, Massachusetts, NYSDOH Environmental Laboratory Accreditation Program (ELAP)-certified laboratories (11148, and 11627, respectively). Sample packaging and shipping procedures are based upon USEPA specifications, as well as 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.

All samples will be shipped within 24 hours of collection 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; and

- place mailing label with laboratory address on top of cooler(s).

2. Arrange sample containers in groups by sample number.
3. Ensure 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 appropriately at the bottom of the cooler to act as a cushion for the sample containers.
6. Arrange containers in the cooler so 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 in packaging material.
9. If ice is required to preserve the samples, ice cubes should be repackaged in Ziploc® 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 courier as appropriate.
11. Separate chain of custody forms. Seal proper copies within a large Ziploc® bag and tape to inside cover of 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 overnight delivery service as appropriate. Retain air bill receipt for project records. (Note: All samples will be shipped for "NEXT A.M." delivery).

6.4 Quality Assurance/Quality Control

TBD will review the analytical data for quality assurance and quality control in accordance with NYSDEC standards. TBD will be performing the data validation for the project. The laboratory SOP for analysis of PFAS is included in Appendix B.

The primary intended use for the data is to confirm that it meets the requirements of the SMP. The primary DQO of the soil and groundwater programs, therefore, is that data is accurate and precise, thus, 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"). Field blanks for PFAS will be collected at a minimum frequency of one per day.

Table 1 lists the requirements for 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. Table 2 lists the preservation, holding times and sample container information.

All "assessment" analyses (i.e., TCL/Part 375 plus 30/ TAL, and ECs) will be performed in accordance with the NYSDEC Analytical Services Protocol (ASP), using USEPA SW 846 methods.

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) and recent updated procedures enacted in November 2018. A Data Usability Report will be prepared meeting the requirements in Section 2.2(a)1.ii and Appendix 2B of DER-10 for all data packages generated for the RA. The DUSR will be prepared by TBD.

7. Site Control Procedures

Site control procedures, including decontamination and waste handling and disposal, are discussed below. Site control procedures have been developed to minimize both the risk of exposure to contamination and the spread of contamination during field activities at the Site. All personnel who come into designated work areas, including contractors and observers, will be required to adhere strictly to the conditions imposed herein and to the provisions of a Site-Specific Health and Safety Plan (HASP).

7.1 Decontamination

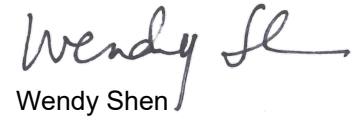
In an attempt to avoid the spread of contamination, all drilling and sampling equipment must be decontaminated at a reasonable frequency in a properly designed and located decontamination area. Detailed procedures for the decontamination of field and sampling equipment are included in Roux's SOPs for the Decontamination of Field Equipment located in Appendix B. The location of the decontamination area will be determined prior to the start of field operations. The decontamination area will be constructed to ensure that all wash water generated during decontamination can be collected and containerized for proper disposal.

Only "PFAS-free" water will be used for decontamination of sample equipment onsite. Only Alconox will be used as decontamination detergent (Liquinox shall not be used).

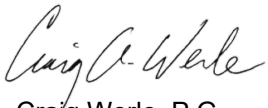
7.2 Waste Handling and Disposal

All waste materials (drill cuttings, decontamination water, etc.) generated during drilling and sampling will be consolidated, and stored in appropriate labeled bulk containers (drums, etc.), and temporarily staged at an investigation derived waste storage area on-site. Roux will then coordinate waste characterization and disposal by appropriate means.

Respectfully submitted,
ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY, D.P.C.



Wendy Shen
Senior Engineer



Craig Werle, P.G.
Principal Hydrogeologist

TABLES

1. Field and Laboratory QC Summary
2. Preservation, Holding Times, and Sample Containers

Table 1. Field and Laboratory QC Summary

QC Check Type	Minimum Frequency	Use
Field QC		
Duplicate	1 per matrix per 20 samples or SDG*	Precision
Trip Blank	1 per VOC cooler	Sensitivity
Field Blank (non-PFAS)	1 per matrix per 20 samples	Sensitivity
Field Blank (PFAS)	1 per matrix per day	Sensitivity
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

PFAS - Per- and Polyfluoroalkyl Substances

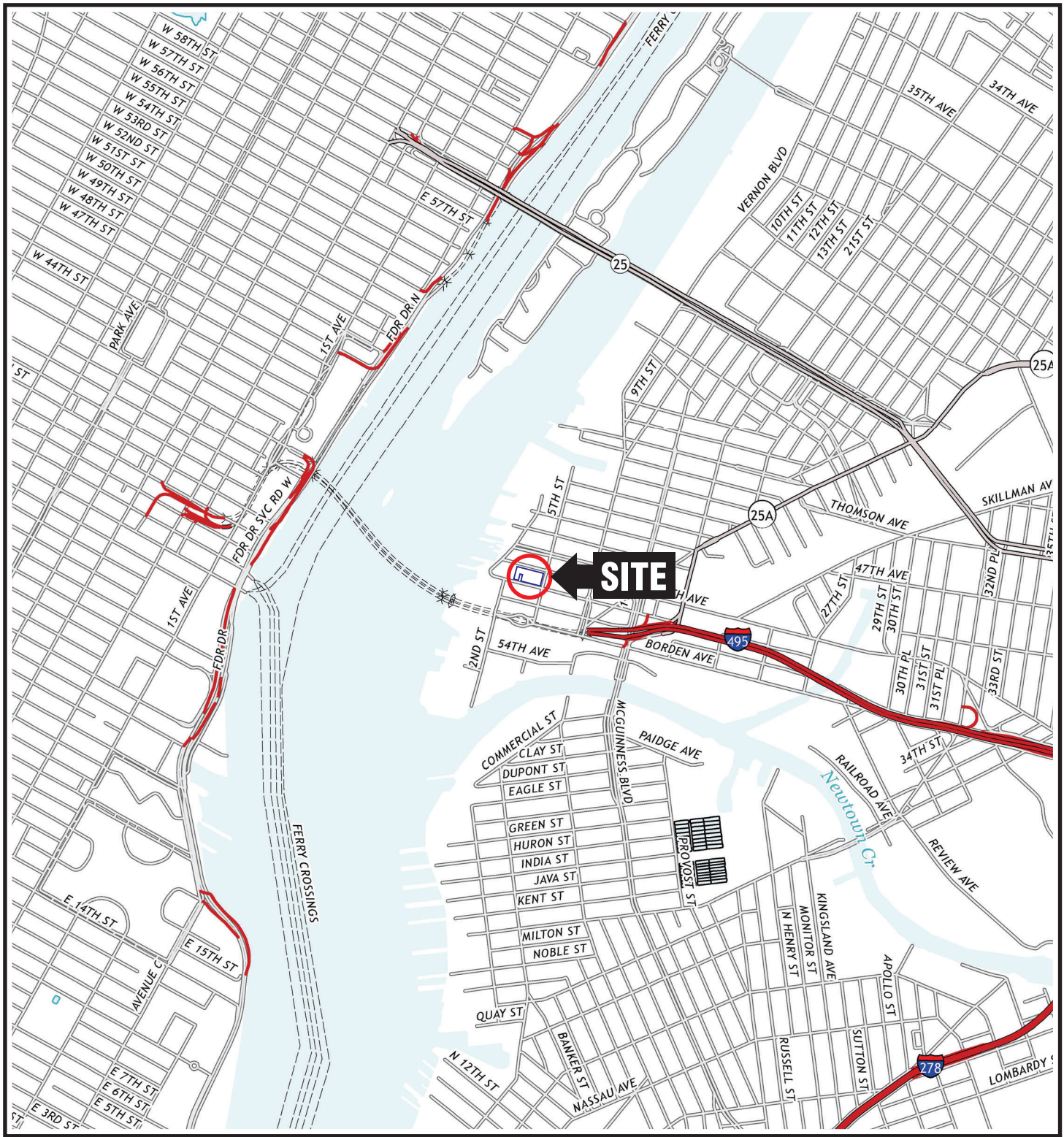
Table 2. Preservation, Holding Times and Sample Containers

Analysis	Matrix	Bottle Type	Preservation(a)	Holding Time(b)
TAL/Part 375 Metals (total) TAL Metals (Total) 6020/Hg	Soil Water	8 oz wide mouth glass, teflon lined cap 500 mL plastic	Cool to 4°C Nitric acid	180 days, Hg 28 days
TAL Metals (Dissolved) 6020/Hg	Water	500 mL plastic	Nitric acid	
Mercury SW-846 7471B	Soil Water	2 oz wide mouth glass, teflon lined cap 500 mL plastic bottle	Cool to 4°C Cool to 4°C	
Hexavalent Chromium	Soil	2 oz wide mouth glass, teflon lined cap	Cool to 4°C	30 days from sample collection to extraction; 7 days following extraction
SW-846 7196A	Water	500 mL plastic bottle	Cool to 4°C	24 hours from sample collection
Total Cyanide SW-846 9010C	Soil Water	4 oz wide mouth glass, teflon lined cap 250 mL plastic bottle	Cool to 4°C NaOH	14 days from sample collection 14 days from sample collection
PFAS via EPA 1633	Soil	One 8 oz HDPE bottle One 2 oz HDPE bottle	Cool to 4°C	14 days to extract, 40 days to analysis
1,4-Dioxane via 8270D 1,4-Dioxane via 8270D-SIM	Soil Water	4 oz wide mouth glass, teflon lined cap Two, 250 mL amber glass	Cool to 4°C Cool to 4°C	14 days to extract, 40 days to analysis 7 days from sample collection
TO-15	Air	6 liter 8-hour runtime Summa canister	None	14 days from sample collection
Target Compound List (TCL)/Part 375				
TCL/Part 375 Volatile Organic Compounds (VOCs)	Soil	Three 5 gram Encore samplers One 2 oz plastic bottle, teflon lined cap	Cool to 4°C	48 hours, or 14 days if extruded into sealed vial and either frozen to -7 degrees C or extruded into methanol
SW-846 8260C	Water	Three 40mL VOA vials, teflon lined cap	Hydrochloric Acid	14 days from sample collection
TCL/Part 375 Semivolatile Organic Compounds (SVOCs) SW-846 8270D	Soil Water	8 oz wide mouth glass, teflon lined cap Two 250 milliliter amber glass, teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis 7 days to extract, 40 days to analysis
TCL/Part 375 Pesticides	Soil	8 oz wide mouth glass, teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis
TCL/Part 375 Herbicides	Soil	8 oz wide mouth glass, teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis
TCL/Part 375 Polychlorinated biphenyls (PCBs)	Soil	8 oz wide mouth glass, teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis

(a) All soil and groundwater samples to be preserved in ice during collection and transport
(b) Days from date of sample collection.
TAL - Target Analyte List
PFAS - Per- and Polyfluoroalkyl Substances
TCL - USEPA Contract Laboratory Program Target Compound List
USEPA - United States Environmental Protection Agency

FIGURES

1. Site Location Map
2. Proposed Groundwater Monitoring Points



QUADRANGLE LOCATION

SOURCE:
USGS; Brooklyn, NY (2013),
USGS; Central Park, NY-NJ (2013),
USGS; Weehawken, NJ-NY (2011),
USGS; Jersey City, NJ-NY (2011)
7.5 Minute Topographic Quadrangles

N

0 2000'

Title:

SITE LOCATION MAP

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50th & 5th LIC LLC

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: J.W.	Date: 11OCT21	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	1
Project Mgr.: W.S.	Project No.: 2887.0004Y000	
File: 2887.0004Y117.01.CDR		

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LEGEND

- SITE BOUNDARY
- GW-01 PROPOSED GROUNDWATER MONITORING WELL
- EP-31 ENDPOINT SAMPLE LOCATION
- SW-8 SIDEWALL SAMPLE LOCATION
- UST-17_9' UST BOTTOM SAMPLE
- SW-20_11' OVER EXCAVATION SW SAMPLES
- NYCT 7 SUBWAY LINE TUNNEL
- PROPOSED CELLAR/TRACK 1 AREA
- TRACK 4 EXCAVATION TO 2 FEET
- FILL EXCAVATION TO 6 FEET
- FILL EXCAVATION TO 9 FEET
- FILL EXCAVATION TO 10 FEET
- FILL EXCAVATION TO 11 FEET
- FILL EXCAVATION TO 12 FEET
- FILL EXCAVATION TO 13 FEET
- FILL EXCAVATION TO 14 FEET
- REVISED TRACK 1 EXCAVATION LIMITS
- 8 FILL DEPTH BGS
- WC-1 EXTENT OF WASTE CHARACTERIZATION GRID

30' 0 30'

N

NOTES

1. PRELIMINARY FILL/REMEDIAL EXCAVATION IN TRACK 1 AREA (NORTHERN CELLAR PORTION OF THE PROPOSED BUILDING) AND TRACK 4 AREA (SOUTHERN SLAB ON GRADE AREA OF THE PROPOSED BUILDING)
2. CONSTRUCTION EXCAVATION OF NORTHERN CELLAR AREA IS APPROXIMATELY 15 FT BELOW GRADE.
3. CONSTRUCTION EXCAVATION OF SOUTHERN SLAB ON GRADE AREA IS APPROXIMATELY 4 FT BELOW GRADE.

Title:

GROUNDWATER MONITORING POINTS

2-33 50TH AVENUE, LONG ISLAND CITY, NEW YORK

Prepared for:

50TH & 5TH LIC LLC

ROUX

Compiled by: W.S.	Date: 27APR23	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	2
Project Mgr: W.S.	Project: 2887.0004Y000	
File: 2887.0004Y155.01.DWG		

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APPENDICES

A. Professional Profiles

B. Standard Operating Procedures, Laboratory Detection Limits for Emerging Contaminants and NYSDEC Guidance for Sampling Emerging Contaminants

C. Proposed Groundwater Monitoring Plan

APPENDIX A

Professional Profiles

ROUX

PROFESSIONAL PROFILE

Craig A. Werle, P.G.

Principal Hydrogeologist/National Client Manager

TECHNICAL SPECIALTIES

Soil and groundwater investigations, delineation of groundwater flow systems, design and implementation of remedial systems, development of regulatory strategy and regulatory negotiations, environmental due diligence, environmental compliance audits.

EXPERIENCE SUMMARY

Twenty-nine years of experience: Principal Hydrogeologist at Roux; Principal at ERM Northeast; Staff Hydrogeologist at Suffolk County, New York Department of Environmental Control.

CREDENTIALS

B.A. Geography, Clark University, 1974
MA. Geology, SUNY Binghamton, 1978

REGISTRATIONS

Licensed Professional Geologist in New York – No. 000469

KEY PROJECTS

Brownfields/Real Estate Redevelopment

- Principal-in-Charge for taking the 22-acre Former Avis Headquarters site in Westbury, New York through the NYSDEC Brownfield Cleanup Program (BCP) for Equity One Inc. The project was constructed on an expedited basis to meet the deadlines associated with opening a major new shopping center. The project required very close coordination with all members of the construction team to ensure environmental issues didn't delay the demolition of existing buildings or construction of a 312,000 sq. ft. new retail space. The project included submission of the BCP Application, RI Work Plan, implementation of the RI including soil, groundwater and soil vapor sampling. An IRM was implemented that included the excavation of 40,000 tons of soil in support of a Track 1 cleanup. The NYSDEC-approved Remedial Action Work Plan (RAWP) was implemented including an in-situ chemical oxidation (ISCO) remedy for groundwater and soil vapor monitoring. All remedial work was completed on schedule and the Final Engineering Report (FER) was submitted and a Track 1 Certificate of Completion (COC) was issued before the first tenants took possession of their space.
- Principal-in-Charge of all environmental services for Vornado Realty Trust Rego Mall Expansion. Project included Phase II investigation, preparation of Remedial Action Plan for NYCDEP approval. Preparation of three-dimensional sample grid for in-situ waste characterization, conduct 495 sample in-situ characterization plan, provide environmental support to project team evaluation of disposal strategy for 400,000 tons of soil/urban fill. Provide full time oversight of 9-month excavation/waste shipment process. Prepare Remedial Action Summary Report and Groundwater Monitoring Report.
- Principal-In-Charge of NYSDEC BCP project in Brooklyn New York. The site is auto dealership with petroleum and chlorinated solvent contamination in soil and groundwater. The site has been accepted in the NYSDEC BCP and the RIWP submitted. Implementation of the RI is expected late in 2012 followed by a track 4 RAWP in 2013.
- Principal-in-Charge for Equity One development of a site in Bronx NY into an urban mall. Project includes entry in the New York City Office of Environmental Remediation (NYCOER) Voluntary Cleanup Program (VCP), implementation of an RI, submittal of an RI Report and RAWP recommending a soil excavation remedy. Remedial activity is expected to begin in late 2012.

Industry Experience

- Principal-in-Charge/Project Manager for ECRA/ISRA project at a major aerospace facility in New Jersey for Fortune 100 client. Project included development of regulatory strategy, on-site delineation of multiple areas of soil contamination including large scale disposal pits, identification of radiological contamination, delineation of free phase oil body containing PCBs, delineation of multi-constituent contaminant plume containing TCE, UST removal, and RCRA storage pad closure. Designed and implemented comprehensive remedial pilot study to evaluate groundwater treatment technologies, feasibility and treatment of SVE/AS system, oil collection technologies. Aquifer test conducted in conjunction with pilot test. Excavation and off-site disposal of 5,000 tons of contaminated soil from waste pits. Investigation of off-site impact of TCE plume migration including health risk assessment.
- Principal/Project Manager for hydrogeologic investigation of largest private landfill in Connecticut. Including installation of multi-aquifer monitoring network, delineation of flow system and leachate plume.
- Site investigation and design of a multi-aquifer groundwater recovery system at a Connecticut NPL site. Extensive off-site contaminant plume contained TCE, PCE, methylene chloride and assorted chlorinated and aromatic hydrocarbons. Design reviewed and approved by USEPA Region 1.
- Project Manager for investigation of landfill leachate impacts in groundwater/surface water at private landfill in Colchester, Connecticut.

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Conducted soil and groundwater testing in support of landfill expansion permit.

- Investigation of organic chemical impacts to groundwater associated with industrial landfill at major chemical plant in Naugatuck, Connecticut. Included evaluation of hydraulic and geochemical relationship of aquifer system and Naugatuck River.
- Principal-in-Charge/Project Manager for a soil and groundwater investigation at a tool and die manufacturer in Greenfield, Massachusetts. Project included delineation of TCE contamination in soils surrounding a closed dry well. Soils remediation completed through excavation and off-site disposal. Mapped TCE plume on-site and 4,000 feet off-site. Development of regulatory strategy/regulatory negotiation.
- Principal-in-Charge for a soil investigation/removal action and groundwater investigation at a Hicksville, New York State-lead CERCLA site. Project included delineation of TCE/PCE plume in the Upper Glacial Aquifer. Key issues included differentiation of on-site solvent sources from upgradient and downgradient plumes of similar contaminants.
- Project Manager for a soil and groundwater investigation at a solvent recovery facility in Linden, New Jersey. Project included delineation of significant on-site soil contamination from a wide variety of chlorinated and nonchlorinated solvents.
- Project manager for installation of groundwater monitoring network at Acabonac Road Landfill, East Hampton, New York.
- Project Manager for an expedited investigation of a TCE plume migrating through fractured bedrock toward the only on-site source of potable water at a major industrial facility in western New Jersey.
- Principal-in-Charge/Project Manager for the investigation of TCE contamination in groundwater at a Farmingdale, New York manufacturing facility. Project included development and negotiation of a work plan with NYSDEC. Groundwater modeling of potential off-site plume migration was responsible for delisting of the facility.
- Principal/Project Manager for a soil and groundwater investigation at a chemical distribution facility in Norwalk, Connecticut. Project included removal of buried drums and soil containing solvents and waste oils, identification of on-site source areas, delineation of solvent plume in glacial sediments and shoreline deposits adjacent to Long Island Sound. Negotiation of project scope and approach with CTDEP.
- Principal-in-Charge for investigation of a million gallon gasoline spill in a complex glacial environment. Delineation of free phase gasoline plume and multiple dissolved phase plumes, including the installation of 250 monitoring wells. Design/installation/operation of a remedial pumping system responsible for the recovery of over 460,000 gallons of gasoline. Primary technical representative for regulatory, community and media interaction. Installation and routine sampling of vapor well monitoring network to evaluate residential vapor impacts.
- Principal-in-Charge for detailed baseline assessments of six oil terminals in the northeastern United States prior to divestiture by a major U.S. oil company. Assessments included evaluation of compliance issues and implementation of soil and groundwater sampling plans and development of quantitative remedial cost estimates.
- Principal-in-Charge of detailed pre-acquisition environmental assessments of the Come-by-Chance Refinery in Newfoundland and the BORCO Refinery in Grand Bahama Island. Projects included evaluation of compliance and remedial issues based on both local and U.S. regulations and the development of remedial cost estimates.
- Principal-in-Charge of the remediation and divestiture of 28 service stations in New York for an independent petroleum company. This multi-year project included the design/installation/operation of remedial systems including free product recovery; dissolved phase recovery/treatment; and soil vapor extraction/air sparging. Use of risk-based corrective action (RBCA) and intrinsic bioremediation strategies resulted in No Further Action closures of many stations.
- Principal for the design and construction of a 7-acre impermeable cap over an inactive pharmaceutical waste landfill. Through construction of the cap, the landfill was closed in accordance with CTDEP Solid Waste Management regulations. The cap consisted of a 6-inch gas venting/bedding layer; 40-mil HDPE impermeable layer; 18-inch sand drainage layer and 9-inch vegetative layer. Stormwater runoff was collected in a series of riprap drainage swales and a culvert, discharging to a retention basin. The cap construction was completed within the allotted timeframe and budget.

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- Principal-in-Charge for the investigation and remediation of a large gasoline leak at a terminal overlying Long Island's sole source aquifer. Project included the delineation of the 11-acre free phase product plume and the 3,000 foot long dissolved phase plume. Design/construction/operation of a 10 well, 800 gpm recovery system. Over 150,000 gallons of free phase product recovered. Remediation of the dissolved product plume was successfully completed and approved by NYSDEC and the system was dismantled. Design/implementation of a 90-day SVE/AS pilot test. Development of regulatory strategy, regulatory negotiations. Technical representation with the community, media, surrounding landowners and political officials.
- Development and implementation of an underground storage tank management plan for major chemical facilities in West Virginia and New Jersey.
- Principal-in-Charge of a site investigation and remediation project in southern New Jersey conducted under the NJDEP voluntary cleanup program.
- Principal-in-Charge for a groundwater investigation at a major petroleum transshipment terminal on Bonaire. Project included installation of 22 monitoring wells, evaluation of geologic and hydrogeologic setting, determination of groundwater quality and distribution of petroleum in the subsurface.
- Principal-in-Charge for the development of a quantitative environmental baseline assessment at a portion of the former Exxon Lago Refinery in Aruba. Project included installation of monitoring wells, collection and analysis of priority pollutant soil and groundwater samples. Evaluation of contaminant distribution within all environmental media was the basis of establishing remedial responsibility with the Aruban government for new site ownership.
- Principal in Charge of RI/IRM at former dry cleaning facility in Glen Cove, New York. Including negotiation of work plan with NYSDEC and New York State Attorney General's office, delineation of residual DNAPL, PCE plume in groundwater and PCE in soil
- Management of an ISRA project at a plastic injection molding faciltiy in Randolph, New Jersey. Issues include TCE contamination in soil and groundwater and hydrocarbon contamination from an UST release.
- ISRA project at a former fabric dyeing facility in Haledon, New Jersey Including delineation of chlorinated solvents and petroleum in soils and groundwater. Remediation includes soil removal and engineering controls and deed notice.

Litigation Support/Expert Witness

- Expert witness for Wiley Rein & Fielding and Melito & Adolfsen, PC for Glidden Company v. Aetna Casualty & Surety Company, et al. Included preparation of expert report for three Glidden facilities and deposition testimony. Report and testimony related to timing and nature of contaminant releases and reasonability of past costs.
- Claim evaluation for Mendes & Mount and London Market Insurers for Harsco Corporation facility in Fayetteville, New York. Evaluation related to insured's contribution to contamination at a site with sequential ownership. Also, evaluation of timing of releases, and relative importance of various source areas.
- Expert witness for Cuyler Burk, LLP in Selective Insurance Co. v. Parsippany-Troy Hills (Sharkey Landfill site). Included preparation of expert report related to the timing of contamination and the insured's understanding of environmental conditions.
- Claim evaluation for Mendes & Mount, LLP and London Market Insurers for five sites owned by Federal Pacific Electric Corp. and Cornell Dubilier Electric Company. The report evaluated sources of contamination, reasonability of past costs and potential future costs.
- Claim evaluation for Hardin, Kundla, McKeon, Polletto & Polifroni and the Royal Insurance Company for two Mark IV Industries, Inc. (former Rexon Technology Corp.) facilities in New Jersey. The primary issues evaluated were sources of contamination relative to owned property concerns, critical review of past costs and a projection of future costs.
- Claim evaluation for Jackson& Campbell and AIG for two RSR Corporation sites including a battery recycling/secondary lead smelting facility in West Dallas, Texas and a multiparty site on Harbor Island in Seattle, Washington. Both sites are on the National Priority List. The evaluation examined contaminant sources, owned property issues and past and future costs.
- Expert witness for Hardin, Kundla, McKeon, Polletto & Polifroni and CNA on a residential petroleum spill in Saddle Brook, New Jersey. The

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expert report evaluated timing of the release, remedial costs and selection of remedial technologies.

- Expert witness in a tax certiorari case at a service station site in Farmingdale, New York. Provided expert testimony related to petroleum release, groundwater impact and remediation costs.
- Fact witness and Principal-in-Charge for an oil company client being sued by a developer related to diminished property value resulting from dissolved phase migration. Provided court testimony related to the nature of the release, migration of free/dissolved phase contaminants, hydrogeologic setting and remedial strategy and efficacy of remedial system operation.
- Fact witness and Principal-in-Charge for an Insured seeking recovery of costs from insurance company at a site in Bay Shore, New York. Provided deposition testimony related to on-site and off-site hydrogeologic investigation, remedial strategy, and off-site recovery system design.
- Fact witness and Principal-in-Charge for a property owner suing a major oil company relative to unremediated environmental impacts from significant gasoline releases at a long term service station lease site.
- Expert witness for The Hartford and Melito & Adolfsen in Gould Electronics, Inc. v. Aetna. Included preparation of expert report and deposition testimony. Expert opinion offered on trichloroethylene contamination of soils and groundwater, DNAPL mechanics and volume
- Expert witness for London Market and Mendes & Mount in TRW Corp. v. London Market Insurers. Included preparation of expert report and deposition testimony. Expert opinion offered on trichloroethylene disposal procedures and state of knowledge concerning TCE toxicity
- Expert witness for Leodori and Napierkowski in Leisure Time Tours v. Continental Insurance Co., et al. Included preparation of expert report related to investigation and remediation of free phase hydrocarbons.
- Expert witness for Rogers Towers Bailey Jones & Gray in Petroleum Products Corp. v. Insurance Company of North America. Included preparation of expert report and deposition testimony related to investigation and remediation of hydrocarbon and PCB contamination
- Principal in Charge of claim evaluation services for Kodak Insurance Defense Group. Includes review and evaluation of environmental reports and invoices related to $298 million claim.
- Claim evaluation for Garrity Graham Favetta & Flinn and Utica Insurance Co. related to North Burlington Regional School District claim. Critical evaluation of documentation for the investigation and remediation of a hydrocarbon release from multiple sources.

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ROUX

PROFESSIONAL PROFILE

Charles J. McGuckin, P.E.

Principal Engineer

TECHNICAL SPECIALTIES

Engineering design of soil and groundwater remediation systems. brownfields cleanup plans, stormwater studies and engineered natural treatment systems.

EXPERIENCE SUMMARY

Thirty years of experience: Principal, Senior and Project Engineer with Roux Associates; President of Remedial Engineering, P.C.; and Design Engineer at Dvirka and Bartilucci Consulting Engineers.

CREDENTIALS

B.C.E., Civil Engineering, University of Delaware, 1987
M.B.A., Management, Adelphi University, 1992
Professional Engineer: New York, New Jersey, Pennsylvania, Rhode Island, Connecticut, Vermont, Virginia, North Carolina, Ohio, Michigan and Montana

PROFESSIONAL AFFILIATIONS

National Society of Professional Engineers
American Society of Civil Engineers
WEF Hazardous Waste Committee, 1996 – 1998

PUBLICATIONS

Assessment and Remediation of Off-Spec Asphalt Disposal Areas - Co-authored, Contaminated Soils, Volume 3, Amherst Scientist Publishers, 1998

Use of a Subsurface Flow Constructed Wetlands for Collection and Removal of Water Containing BTEX, Co-authored, Proceedings of the 2000 Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference, National Ground Water Association

KEY PROJECTS

- Principal Engineer for environmental consulting support services for a large landfill O&M contract under review by the New York City Department of Investigation. The work entailed reviewing the scope of routine vs. non-routine work performed over a one-year period for compliance with contract requirements. The O&M Work included routine cover maintenance, groundwater and gas monitoring, landfill gas extraction, major system repairs and waste handling. Memos of findings were prepared assessing acceptability of work, compliance with permit regulations and providing recommendations for improvements.
- Principal Engineer for the independent engineering review of change orders for the New York MTA Office of the Inspector General associated with electric utility substations reconstruction damaged during the 2012 Superstorm Sandy. The cost review focused on contracting procedures, waste classification of impacted structures and soils, proper waste management and disposal. Findings were compiled in a report to determine if costs were legitimate and justifiable and providing recommendations for improved specifications for bidding and of management waste handling contracts.
- Principal Engineer providing program management of interior building materials surveys for 22 residential buildings along the south shore of long island under an Army Corps of Engineers contract for dune reconstruction. Building materials surveys included testing and analysis of suspect contaminants and reporting in support of building abatement and demolition planning. Testing was completed using multiple teams on a tight timeline to meet project schedule requirements.
- Principal Engineer for remedial action plan implementation oversight and certification for the CornellTech campus development on Roosevelt Island, New York. The first phase of the campus development included lead paint and ACM abatement and demolition of the former Goldwater Hospital, construction of six main campus buildings, new utilities, roadways and lawn/landscaped areas. Responsibilities include oversight of soil/subsurface structures excavation handling, disposal and reuse; community air monitoring; dewatering permit compliance; and SWPPP inspections.
- Principal Engineer for the preparation of an expert report for a former valve manufacturing facility in Coxsackie, New York. The report was prepared on behalf of counsel for a Contractor who performed remedial construction work for this State "Superfund" site. The actions were against the holder of the construction contract, NYSDEC, and their engineering consultant. The remedial action included building demolition, remediation of soils impacted by chlorinated VOCs, removal of DNAPL source areas, treatment of excavated soils using low temperature thermal desorption, and consolidation and capping of metals impacted soils. The expert project work involved a detailed review of the RI/FS, remedial action plans and construction progress documentation to formulate opinions as to the industry acceptable accuracy of the Contract Documents.
- Senior Engineer for the decommissioning and decontamination of a pharmaceutical facility covering seven city blocks as a part of a NYSDEC Voluntary Cleanup Agreement in Brooklyn, New York. The former office and laboratory complex would be decontaminated for reuse as a school and small business space. Multiple other buildings were demolished. Responsibilities included preparation of interior abatement plans to address mercury, lead and PCBs in building materials and review of Interim Remedial Measure (IRM) work plans for lead, benzene and mercury-contaminated soil excavation and disposal. Groundwater remediation design included air sparge/soil vapor extraction, in situ oxidation and a reactive barrier wall using colloidal carbon and ZVI.
- Principal Engineer for the performance of a Brownfields Demonstration Pilot Program in the Hamlet of New Cassel for the Town of North Hempstead, New York. Under an EPA grant, Roux Associates created an inventory of 50 potential commercial/industrial properties within New Cassel and evaluated these properties based on perceived contamination and potential for redevelopment/reuse. Eight sites exhibiting the greatest potential for redevelopment were selected to perform Phase I

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Principal Engineer

Environmental Site Assessments. Of these eight sites, four sites were selected for Brownfield Site investigations to identify the nature and extent of contamination in soil and groundwater and provide potential remedial alternatives and cleanup costs to revitalize these properties. The Brownfields Demonstration Pilot Program also included community outreach activities to promote a unified approach to the redevelopment of Brownfields in new Cassel.

- Principal Engineer responsible for engineering certification of all remediation activities related to the seven-city-block Barclay's Arena and Atlantic Yards redevelopment in Brooklyn, New York. This multi-billion-dollar redevelopment includes the Arena, which will be focal point of the largest redevelopment project in Brooklyn, consisting of an urban complex of housing, commercial and retail space, as well as several acres of landscaped public open space. The existing properties being redeveloped are residential, commercial, and industrial properties, including a large railroad yard. Engineering certification included multiple RAWPs under NYSDEC Spills Program, UST removals, soil excavation, in situ groundwater treatment and remedy oversight services. The project also includes ACM abatement, building demolition, soil pre-waste-classification, coordination (with the receiving facilities), and oversight of the removal of 1,000,000 cubic yards of soil (~550,000 yards removed to date), representing one of the largest excavation and soil removal projects performed in New York City.
- Principal engineer for the preparation of the feasibility study, IRM plans, and remedial design/remedial action plans for a 40-acre former manufacturing facility in Rensselaer, New York. IRM Soil remediation included excavation of over 10,000 cubic yards of CVOC and metals source material for disposal at multiple facilities based on waste characteristics. Basement cleaning was performed in three large buildings to remove accumulated process sludges. Lagoon closure plans included sediment removal, dewatering, soil washing, and soil capping. The final remedy for the site includes a groundwater perimeter containment trench and 40 gpm treatment system for metals and VOCs and a 9-acre vegetated cap for a former landfill.
- Principal Engineer responsible for the preparation of the remediation completion report at Captain's Cove former municipal landfill State Superfund Site located in Glen Cove, New York. This work has been performed in accordance with Title 3 of the NYS Environmental Quality Bond Act under contract to the City of Glen Cove. Design elements included excavation plans, radiological waste monitoring, demo debris and waste separation and screening, dewatering water management, waste disposal, and site restoration. Additional work included the delisting of a six acre "clean" portion of the site to allow the development of a ferry terminal and esplanade and development of alternative cleanup standards consistent with future site uses. Site remediation will accommodate site redevelopment as a commercial waterfront and operating ferry service and seaport area.
- Principal Engineer for the feasibility studies and remedial action work plans for multiple operable units of a large railyard located in Sunnyside, Queens, New York under the NYSDEC Inactive hazardous waste program. For the former engine house and maintenance area unit, pre-design studies included product plume thickness data collection and modeling, ex situ biopiles treatment, *in situ* enhanced bioremediation, and *in situ* chemical oxidation. The final design consisted of decontamination and removal of structures, excavation of hot spot soils for PCBs and lead, UST closures, a dual phase high vacuum extraction system and *in situ* bioremediation.
- Principal Engineer for the remediation of a former Manufactured Gas Plant (MGP) facility in Brooklyn, NY, including oversight of the excavation of both the former gasholders, and adjacent contaminated hotspots requiring offsite thermal desorption of over 30,000 tons of coal tar impacted soil. Directed the Community Air Monitoring Program (CAMP) specific to the MGP impacted soil removal, as required by both New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH). Remedial activity met all substantive requirements of the NYSDEC approved Remedial Action Work Plan for the Site. The remedy included design of a passive subsurface vapor monitoring/recovery system for a 500,000 sq. ft. retail structure in Brooklyn, NY. The system design integrated a perforated piping system complemented by a protective vapor barrier below the structural floor slab to monitor and mitigate volatile organic compound vapors. Multiple vapor barrier options were evaluated to determine the optimum design based on the site conditions.
- Principal Engineer providing expert settlement support services to a county municipality in New York State. The case involved an EPA Order for underground storage tank (UST) compliance for over 50 county operated facilities with over 125 USTs. The project involved the field inventory of the USTs at each facility and development of both Interim and final compliance plans to comply with EPA, NYSDEC and local UST regulations. Detailed cost estimates were prepared for multiple scenarios for upgrading USTs including tightness testing, manway repairs, leak detection and overfill protection monitoring systems, UST removal and replacement, and new piping. The upgrade evaluation and negotiations included incorporation of Supplemental Environmental Project (SEPs) in accordance with EPA requirements. SEPs included centralized monitoring systems for leak detection and inventory control.
- Principal Engineer for preparation of a site management plan for redevelopment of a former watch case factory in Sag Harbor, New York. The primary engineering controls for the former factory conversion to a residential building consisted of a vapor barrier and an active subslab depressurization

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system (SSDS) to address chlorinated VOCs. The SSDS system was complicated due to the existing 100-year-old structure. A unique raised floor approach was designed to allow for the SSDS installation. The system design, approved by NYSDEC and NYSDOH includes multiple legs, dual blowers, low vacuum alarms and monitoring points.

- Principal Engineer for the Remedial Action Work Plan (RAWP) for redevelopment of a shopping center in the Bronx, New York. The RAWP elements included soil and groundwater management plans, stormwater management, air monitoring and vapor mitigation systems. To address vapor intrusion, active subslab depressurization systems were designed for two pad buildings. One system for a new retail building construction and one retro-fit system for an existing building to be used as a restaurant. Closure reports were prepared and certified documenting all remediation work and approved by NYC Mayor's Office of Environmental Remediation (OER).
- Principal Engineer for the preparation of a preliminary remedial design for the remediation and restoration of a pond and surface water tributaries to Canaan Lake that have been impacted from leachate generated from an upgradient former municipal landfill located in Holtsville, New York. Completed a preliminary remedial design for the construction of a compost-based permeable reactive barrier for the removal and treatment of leachate prior to discharge to the surface water, followed by restoration of the surface water body and surrounding wetlands. The project included development of a long term remedial strategy to reduce rainfall infiltration into the landfill and minimize leachate generation. Current plans to reduce rainfall infiltration include the planting of 3,250 hybrid poplars, regrading and lining of drainage swales, and the resurfacing of low lying areas consistent with recreational facilities.
- Principal Engineer for final capping elements and wetlands restoration work and completion of the Final Engineering Report for an inactive hazardous waste site in Syracuse, New York. The project included onsite consolidation of lead impacted waste; 7-acre landfill cap with vegetated layer, cover soil, and geomembrane; stormwater runoff controls; reconstruction of waste water ponds; and an 8-acre wetland restoration. An O &M Plan was prepared and implemented consisting of groundwater, surface water and landfill gas monitoring, and annual cap and wetland inspections.
- Principal Engineer for the preparation of the remedial action work plan for an 11-acre former Department of Defense owned Site that manufactured airplane parts along Hempstead Harbor in Manorhaven, New York. The project is regulated under the NYSDEC Voluntary Cleanup Program. The remedial design consisted of both soil vapor extraction/air sparging and *in situ* enhanced bioremediation systems for Site groundwater impacted by chlorinated VOCs. The final remedial design and site management plan are expected to include soil capping, vapor barriers and passive ventilation systems to be incorporated into a residential redevelopment with waterfront access.
- Project Engineer for the design and construction management of a 600 gpm groundwater extraction and treatment system to prevent offsite migration at a petroleum storage and pipeline transfer facility in Providence, Rhode Island. The treatment system was designed to remove iron, BTEX, and naphthalene from the groundwater to below surface water discharge standards for the Providence River. The system processes consisted of equalization, aeration, de-aeration, flocculation, clarification, air stripping, dual media filtration, granular activated carbon adsorption (liquid and vapor phase), and sludge thickening and dewatering. The system included an outfall diffuser designed in accordance with the CORMIX computer model.
- Senior Engineer responsible for the design, construction management, and O&M of a 60,000-gpd constructed wetlands treatment system for a former manufacturing facility in Virginia. The 16-acre treatment system was designed within an existing phragmites wetland to remove zinc and iron from landfill leachate prior to discharge to an adjacent creek. The treatment system consisted of alkalinity producing cells, oxic ponds, compost and limestone berms, anaerobic cells and aerobic cells. The design included a 400-foot reinforced earthen dike together with hydraulic control structures and piping to maintain cell water levels and flow rates. The system also includes a pump station and force main for both effluent discharge and irrigation purposes. Joint wetlands and local permit approvals were obtained for the project.
- Senior Engineer for the performance of a stormwater runoff evaluation for a manufacturing facility in Watertown, New York. Roux Associates was retained as third party to evaluate the drainage design and construction elements for an industrial landfill cap. The evaluation was performed for the facility owner in support of potential litigation arising from onsite building flooding incidents following a severe snow and rain storm event. The scope of work included an evaluation of the existing onsite storm sewer system capacity, calculation of runoff flow rates for the 300-acre contributing area, review of landfill cap surface drainage design, review of erosion control measures implemented during construction, and analysis of specific flooding incident causes. The runoff analyses were performed using the TR 55 Method for three conditions: pre-capped, capping under construction prior to establishment of vegetation, and final vegetated cap design. Recommendations were made to improve the site drainage including design of surface drainage swales, temporary berms and sediment traps during construction and modification of snow handling practices.
- Senior Engineer for the performance of a feasibility study and remedial design for the closure of a concrete oil/water separator filled with refinery sludge and demolition materials impacted with lead at a former

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refinery in Providence, Rhode Island. Remedial alternatives were developed and evaluated including capping and containment using a perimeter slurry wall, sheet piling or concrete wall sealing; excavation and disposal; and *in situ* solidification. The capping and containment using a slurry wall alternative was selected for implementation of the remedial design. The design consisted of removal and replacement of existing monitoring wells, sealing of separator wall openings, a 2-acre multi-layer cap, a 1200-foot long by 30-foot deep soil-bentonite slurry wall, and a perimeter drainage swale. The multi-layer cap included a 40-mil HDPE geomembrane and a geosynthetic clay liner. The slurry wall was keyed into the existing clay confining layer beneath the separator. The design incorporated disposal of an additional 10,000 cubic yards of petroleum impacted soil under the cap.

- Principal Engineer for the preparation of field implementation plans, construction monitoring, and Engineers Certification Report for a former manufactured gas Plant (MGP) site in Manhattan, New York. The site was one of the first projects completed under the NYS Brownfields Cleanup Program. The remedy included soil excavation and offsite thermal treatment, a sheet pile barrier wall, a vapor barrier and basement ventilation system. A comprehensive air monitoring program was conducted due to the concerns over coal tar residue emissions and odors on the surrounding community. The remedy was incorporated into the design and construction of the headquarters office building of an international media company.
- Principal Engineer for the management of a soil and ground-water remediation system for a nationwide overnight delivery distribution center in Brooklyn, New York as part of the NYSDEC Voluntary Cleanup Program. A risk-based remedial approach that called for the remediation of "hot spot" source area soils, and mass-reduction of VOCs was successfully utilized for the Site. As a result, the focus of remediation was on reducing the mass of VOCs in on-site groundwater to a level where natural attenuation would be effective in remediation of VOCs. To address the contamination in the source area, a soil vapor extraction (SVE) and air sparge (AS) system consisting of 8 SVE wells and 17 AS wells was designed, constructed, operated and maintained for a period of approximately 3 years. Permanent shutdown of the system was approved by the NYSDEC.
- Senior Engineer for the design and construction management of a soil remediation and stormwater management project at a 16-acre former pesticide warehouse facility in Dayton, New Jersey. The Site was redeveloped for storage and trailer parking. The project consisted of consolidation of pesticide contaminated soils; asphalt capping of the 3.5-acre contaminated soils area; stormwater collection, conveyance and detention; and site regrading. The evaluation included TR-55 runoff modeling for pre and post capping and development conditions. The storm sewer system consisted of multiple catch basins, over 2,000 linear feet of reinforced concrete pipe ranging in size from 15 to 30 inches, and a recharge basin. A Soil Erosion and Sedimentation Control Plan and a NJPDES General Permit were prepared for the project.
- Project Principal for the performance of LNAPL remediation studies at the New Jersey Transit former Lake Street Bus Garage in Newark, New Jersey. The studies involved evaluating remedial alternatives for free product recovery, performance of an LNAPL recovery pilot test and cost estimating. A RAWP and engineering design plans were prepared for both the bus garage and the adjacent park properties. The remedy included excavation of the source area, horizontal recovery wells, a vertical recovery trench, *in situ* oxidation injections and product recovery using vacuum extraction.
- Senior Engineer for the performance of a stormwater management analysis for a 28-acre industrial landfill in Virginia. The principal objective of the study was to identify engineering controls to minimize stormwater runoff to a metals-contaminated sediment impoundment. The study included TR-55 runoff modeling and storage analyses for multiple detention ponds. Three engineering control alternatives were identified including landfill cap regrading, diversion using berms and swales, and diking and weir raising.
- Senior Engineer for the investigation, design, and construction management of the closure of a 2-acre fire-water supply pond and modification of the stormwater conveyance system at a former manufacturing facility in Williamsburg, Virginia. The investigation phase of the project was focused on determining the sources and loading of metals influent to the pond. Field activities included examination of the existing stormwater drainage system, subwatershed delineation, groundwater monitoring, and installation of automatic stormwater sampling devices. The final design included 400 feet of open concrete channels, 250 feet of culvert replacement, sliplining of 370 feet of 36-inch RCP culvert, reconstruction of five catch basins, placement of 10,000 cubic yards of clay fill within the pond and regrading of existing drainage ditches. Erosion control measures and slope stabilization were also included as well as the design of a special outlet structure for minimizing erosion at the outfall.
- Project Principal for the investigation and closure of five USTs at the New Jersey Transit Broad Street Station site in Summit, New Jersey. Tank sizes ranged from 20,000 to 30,000-gallon capacity. UST closure program completed in accordance with the NJDEP Technical Requirements for Site Remediation. Closure report prepared and submitted to the NJDEP and subsequent issuance of a No Further Action letter from the NJDEP.
- Project Engineer of the underground storage tank (UST) program for a major retail chain store in the New York, New Jersey and Pennsylvania region. Responsibilities included preparation of a UST management plan based on federal, state, and local regulations and costs to prioritize UST maintenance.

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Charles J. McGuckin, P.E.
Principal Engineer

The tank designs included plans and specifications for the removal and replacement, or upgrading, of USTs to meet regulatory requirements. The engineering design involved fuel requirements for dual heating and back-up generator usage, mechanical pumping equipment and fire wall design.

- Project Engineer for the design and construction management of a 1,000 sq. ft. hazardous and flammable materials storage facility in Syosset, New York. The facility included concrete secondary containment dikes, access ramps, sprinkler system modifications, and lighting. The separate flammable materials area included 2-hour fire rated concrete block walls and doors, ventilation equipment and a fire alarm system. Permitting services were performed for the Nassau County Department of Health, the Nassau County Fire Marshall, and the Building Department.
- Project Engineer for the design of a 2,000 sq. ft. hazardous waste storage facility in Astoria, New York. Prior to construction, demolition of an existing building was required and included removal of asbestos and lead paint. The project included driving treated timber piles and excavation and removal of contaminated soil and groundwater. The structure consisted of a steel frame with a metal standing seam roof system, decorative masonry block walls, and a roll-up door. Temporary and permanent fencing were required along with concrete sidewalk replacement.
- Senior Engineer for the decommissioning of a pharmaceutical facility covering two entire city blocks as a part of a NYSDEC Voluntary Cleanup Agreement in Brooklyn, New York. Responsibilities include technical review of Interim Remedial Measure (IRM) work plans for lead and mercury-contaminated soil excavation and disposal, implementation of these work plans (excavation and offsite disposal), preparation of biddable plans and specifications, review of IRM Closure Reports, and obtaining closure documentation from regulators on a fast track basis to allow redevelopment for a large-scale shopping complex and public schools.
- Senior Engineer providing construction management services in support of the BNYCP Cogeneration Facility construction and Brooklyn Navy Yard facility decommissioning. Work included preparation of construction management plans, supervision of soil, concrete, and sediment disposal activities, asbestos surveys, and PCB sampling and analysis work. A NYCDEP wastewater discharge permit was prepared for the million gallon per day stream condensate and wastewater backwash flow rate.
- Project Principal for performing remedial alternative cost estimating for a New Jersey Transit site in Montclair, New Jersey, which is to be redeveloped as a firehouse. A cost estimate prepared by another consultant was reviewed as part of the scope of work. The proposed remedial alternative for the site consisted of excavation and disposal of PAH-impacted fill material and capping. The alternative remedy proposed by Roux Associates was a more risk-based approach, resulting in a cost savings of approximately $100,000 for New Jersey Transit.
- Project Engineer for the design and construction management of cap repair and drainage improvement measures for an industrial hazardous waste landfill in Tennessee. Components of the design included replacement of the primary clay cover material, temporary and permanent erosion and sedimentation control measures, and a lined drainage channel to minimize the generation of landfill leachate. The project included the performance of a focused feasibility study to characterize the flow, quality, and treatability of the leachate. A feasibility study was also performed in order to evaluate constructed wetlands remedial technology as a method of effective and economical treatment of leachate.
- Senior Engineer for the remedial design and construction management of a 7-acre off-spec asphalt waste pond at a former refinery in New England. The asphalt material exhibited a low load bearing capacity combined with a viscous, tacky surface. An *in situ* solidification mix design was developed consisting of liquification using hot water and a 2-stage lime kiln dust reagent injection and mixing step. Gravel was added to the mix when the existing subgrade material was of insufficient bearing capacity. Solidified material was tested for unconfined compressive strength, durability, and TCLP. The final cover material consisted of a 6-inch vegetated layer.
- Principal Engineer for the performance of LNAPL remediation studies for a former bus maintenance facility and a segment of a Metropolitan Subway System in Newark, New Jersey. The studies involved evaluating groundwater and soil monitoring data, performance of LNAPL recovery pilot tests, evaluation of remedial alternatives and cost estimating. Recommendations included the use of mobile high vacuum extraction methods to collect LNAPL while minimizing capital expenditures and permanent low vacuum extraction methods to minimize odors to subway cars and surrounding communities.

Litigation Support Experience

- Project Engineer for the evaluation of remedial investigations and remedial cost estimates for a 30-acre former book publishing facility in Poughkeepsie, New York. The evaluation included the review of Phase I and Phase II investigation reports, remedial investigation (RI) and feasibility study (FS) reports, and the remedial investigation work plan. The findings included the presence of chlorinated volatile organic compounds in the soil and groundwater as well as identification of underground storage tanks. Deficiencies were identified in both the RI and FS reports by comparing with the NYSDEC's required criteria and recommendations were proposed for the RI work plan to further delineate source areas. Based on the remedial investigation review, revised costing assumptions were made and remedial cost estimates were prepared totaling $3.6 million.

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Principal Engineer

- Project Engineer for the evaluation of expected remedial costs for nine hazardous waste sites, two of which are federal superfund sites. The evaluation of both single and multiple PRP sites was performed to identify costs for an insurance claim. The expected remedial costs for nine sites, which include landfills or facility surface impoundments, totaled approximately $65 million. Remedial plans evaluated for multiple site operable units included groundwater pump and treat, alternative water supply systems, soil/sludge *in situ* solidification and treatment, and wetlands restoration. Additional work included evaluating invoices for site work previously performed and allocating expenses into their appropriate operable unit and work type, i.e., defense or indemnity.

Water Treatment Experience

- Senior Engineer for the engineering design of a 10 gpm groundwater recovery and treatment system at a former tank farm in Rhode Island. The recovery system included a 200-foot slotted HDPE horizontal well, a 400-foot coated concrete swale and curbing, and a series of seepage collection points manifolded to a common receiving structure. The entire system was designed for passive recovery and gravity flow transmission targeting free-product seepage areas. The treatment system consisted of a collection sump retrofitted within an existing separator, a coalescing plate oil/water separator, a surge tank, a bag filter, and carbon adsorption units. The project included a permit modification for discharge to the Providence River.
- Design Engineer for the design and start-up operation of a 2 mgd packed tower aeration system for potable water in Williston Park, New York. The primary contaminants were trichloroethane and tetrachloroethene which were stripped below drinking water standards. The design process included full scale pilot testing to assure proper removal levels.
- Design Engineer for the design, construction and start-up operation of a 5 mgd industrial cooling water treatment system utilizing mechanical surface aeration. The system consisted of two lined aeration basins operating in series with floating mechanical aerators to remove volatile organic contaminants to levels suitable for recharge into the Long Island groundwater aquifer. The primary contaminants were 1,1-dichloroethene, trichloroethane, tetrachloroethene and vinyl chloride.
- Design Engineer for the design and construction of a 4 mgd granular activated carbon system for potable water in Hempstead, New York. The primary contaminants consisted of more than 8 volatile and semivolatile organic compounds. Responsibilities included site inspection for the installation of the six vessels containing 20,000 lbs. of carbon in each. The system was designed for 99.9% removal efficiency with two units operating in series.

Constructed Wetlands Experience

- Senior engineer for the conceptual design of a constructed wetlands stormwater treatment system for a coal handling freight railroad facility in Norfolk, Virginia. The design consists of treatment of contaminated stormwater runoff generated from maintenance and fuel handling areas onsite. The design treatment performance objective is the reduction of total suspended solids, oil and grease, and selected metals to levels below the SPDES permit discharge standards established for two of the site's outfalls discharging to the Elizabeth River. The 3-acre system consists of a passively operated 200,000-gpd subsurface-type constructed wetlands with a low visual impact and specialized structural design to meet the needs of a busy railyard facility. Additional design components include stormwater bypass structures, jacking beneath tracks, a grit chamber, a lift station, and outfall modifications. A joint wetlands permit will be prepared for the project.
- Senior Engineer for the feasibility study, conceptual design and construction of four constructed wetlands units and sedimentation basin for a stormwater treatment system along Cedar Swamp Creek for the City of Glen Cove, New York. The project consisted of review of stormwater studies of the 12 square mile contributing watershed, compilation of USGS water quality and flow data, evaluation of stormwater treatment methods and best management practices and optimum site selection along the creek. The constructed wetlands design included a forebay, high and low marsh cells, a micropool, and stormwater bypass structures for removal of sediment, nitrogen, phosphorus, and trace metals during first flush events. Final design for the first 1.8 acre constructed wetlands unit was completed and performance of construction management is ongoing. Design activities include structural and hydraulic design tasks with specific emphasis on storm water bypass. The design has been integrated into an into an intermodal transportation project with the addition of bicycle and walking paths. NYSDEC and Army Corps permits were obtained for the project.
- Project Engineer for the design of a 7,000 gpd subsurface flow-type constructed wetlands treatment system for a refinery site in Rhode Island. The system was designed to treat a surface-water stream impacted by petroleum hydrocarbons. The system's high aesthetic, low visual impact appeal was ideal for its golf course setting. Both phragmites SPP and Typha SPP wetland species were incorporated in the design in order to assess the biodegradation/biotransformation processes effectiveness. A growth and maturation plan and a treatment evaluation plan were developed in order to evaluate the system performance.
- Lead Engineer responsible for technical review of a design for modifications to a constructed wetlands system in Nicholas County, West Virginia. The system was designed to treat the leachate from a solid waste landfill at a maximum capacity of 30 gpm. The complete water tight treatment system consisted of a sedimentation basin, stabilization basin, a series of three wetland cells and a finishing ditch. The wetland cells consisted of a double liner system with leachate collection piping overlaid with stone fill and a matrix of plant life. The technology combines physical,

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geochemical and biological removal mechanisms operating simultaneously.

Permitting/Compliance Plans

- Project Engineer for the preparation of a Spill Prevention Control and Countermeasure (SPCC) Plan and a Storm Water Pollution Prevention Plan (SWPPP) for an 850-acre petroleum storage terminal in New England. The SPCC Plan involved the inventory of 50 bulk storage tanks and miscellaneous storage vessels and an assessment of barge loading areas, truck loading racks, additive loading areas, pumping stations, and a network of aboveground pipelines. The SWPPP encompassed an inventory and surveying of the existing storm sewer system, an evaluation of oil/water separator performance and identification of storm water management controls and practices.
- Project Engineer for the design of modifications to multiple discharge facilities along the Providence and Runnins Rivers in Rhode Island. Permitting activities were performed with the following agencies: Rhode Island Department of Environmental Management (RIDEM) Pollutant Discharge Elimination System (RPDES), RIDEM Division of Freshwater Wetlands, Coastal Resources Management Council (CRMC), and the Army Corps of Engineers.

Sanitary Experience

- Design Engineer for the evaluation of a municipal sanitary sewer system consisting of approximately 70 miles of piping ranging in size from 8 inches to 16 inches, in Garden City, New York. The sewer system was evaluated for existing and proposed flow capacity, surcharging, infiltration of groundwater, inflow of storm water, root encroachment, and sewer breaks. Evaluation methods consisted of hydraulic profile analysis, television inspection of piping, field inspection of manholes, and flow measurement. Sewer upgrading methods were evaluated including direct replacement, manhole restoration and pipe slip lining, and a rehabilitation program was implemented.
- Design Engineer for the City of Glen Cove's industrial wastewater pretreatment program which was established to monitor significant industrial users discharging to the city's wastewater treatment plant to minimize upsets to the biological treatment mechanisms. The program work included annual facility inspections, wastewater discharge sampling, review and evaluation of quarterly self-monitoring results, calculation of discharge penalty fees, preparation of annual monitoring reports for each facility and development of wastewater discharge permits to comply with City regulations.
- Design Engineer for a heavy metals study for the municipal sanitary sewer system in the City of Glen Cove, New York. The heavy metals study consisted of the development and performance of a city-wide sewer sampling program to identify the sources of heavy metals loadings on the wastewater treatment plant. The evaluation included industrial sources, scavengers, non-industrial sources, the plant operation itself, and review of existing heavy metal studies. Recommendations were provided for minimization of loadings and pretreatment to protect the plant operations.

Stormwater Experience

- Design Engineer for the evaluation and conceptual design of a water management plan for a 200-acre proposed office complex in Bethpage, New York. The design included inlets, piping and recharge basin sizing for peak storm water runoff flows as well as a system of architectural ponds and level control structures. For dry periods, the design included flow controls connected to an existing cooling water system to maintain pond levels and for utilization as a water supply for an irrigation sprinkler system during the growing season.
- Design Engineer for the design of a municipal storm drainage system for a 200-acre contributing area in Garden City, New York. The purpose of the drainage system was to alleviate severe flooding problems for eight homes located in a local low point of a residential neighborhood. The system included over 4,800 linear feet of reinforced concrete piping ranging in size from 12 to 60 inches. Design considerations included hydraulic gradient analysis, inlet capacity, utility crossings, minimization of removals of established trees, a county road crossing, utilization of existing structures and piping, and a headwall discharge to a recharge basin. Additional design items included pavement restoration, service line relocations, curbs and sidewalks, and maintenance and protection of traffic.

Site Assessment Experience

- Senior Engineer for coordination and review of Phase I environmental site assessments for five large research and development complexes located throughout the eastern United States for a major chemical company. The site assessments were performed for due diligence prior to engaging in long-term property lease agreements. The site assessments evaluated chemical storage and handling areas and previous site usage.
- Senior Engineer for coordination and review of Phase I environmental site assessments for 12 properties associated with tennis centers acquisition on Long Island, New York. The properties were either active tennis center facilities or vacant parcels available for new construction. All site assessments were conducted in accordance with ASTM standards for commercial real estate transactions. Primary concerns identified were USTs, drum storage areas, and unauthorized dumping.
- Project Manager representing a group of banks investing in a 20-acre commercial property in Westchester, New York. The onsite soil was contaminated with several volatile and semivolatile organics. Performed an evaluation of the remediation plan which included onsite biological treatment of soils and aeration and oil water separation of groundwater.

Water Main Experience

- Project Engineer for the design of over 6,000 feet of ductile iron water main in sizes from 4 to 16 inches for Town of Hempstead, New York Department of Water

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Principal Engineer

and the Nassau County, New York Department of Public Works. The designs included wet and dry connections to existing mains, fittings, valves, copper services and fire hydrants. Restoration work included replacement of asphalt pavement, concrete sidewalk and curbs, and grass areas.

- Design Engineer for the design and construction management of over 10,000 feet of ductile iron water main in sizes from 6 to 12 inches for the Town of Wallkill, New York. The designs included booster pump station upgrades, a stream crossing, a wetlands crossing, jacking of 36-inch casing beneath a state highway, air release chambers, copper service re-connections, fire hydrants, valves and appurtenances. Restoration work included wetlands restoration, backfilling and regrading within a NYSDOT right-of-way and grass and pavement replacement.
- Design Engineer for the design and construction management of upgrades to a 3.7 mgd potable water booster pump station for the Town of Wallkill, New York. The design featured the replacement of a hydropneumatic tank and pump system with three larger capacity centrifugal pumps. The upgrades were performed while maintaining the pump station service. The pump station revisions included piping, pump pads, shut-off valves, silent check valves, pressure relief valves, gauges, ventilation equipment and a motor control center.

Feasibility Study Experience

- Senior Engineer for the performance of a feasibility study and remedial design of a free product containment and recovery system at a former refinery in New England. The areal extent of the free-product plume was approximately 10 acres with a measured thickness of up to eight feet. Pilot testing activities consisted of pump tests, baildown tests, and funnel and gate systems with and without sheeting. The selected remedial alternative consisted of re-routing and repair of active storm sewer piping, closure-in place of a former 72-inch storm drain using clay fill material to form a barrier wall, and installation of multiple recovery trenches totaling 450 linear feet. The recovery trenches were installed to a depth of 14 feet using a deep trenching machine and were completed with gravel, horizontal perforated piping, recovery wells, and monitoring wells to accommodate both passive and active product recovery pumping equipment. Product recovery enhancement pilot testing was also performed by using non-ionic surfactants, mechanical re-working of soil and vacuum extraction methods.
- Project Engineer for the performance of a feasibility study for the containment of a free-product plume beneath a refinery site in Rhode Island. The feasibility study included analysis of groundwater modeling, bench and pilot scale treatability studies, groundwater quality characterization, identification and screening of discharge alternatives, and treatment process evaluations. The work also included the evaluation of the discharge of treatment system effluent to several receptors including groundwater, wetlands, sanitary sewers, and storm sewers. Discharge requirements were evaluated for process water, off-gas air and residual wastes. Several treatment processes were also evaluated including metals precipitation and sludge dewatering, VOC and SVOC removal, and off-gas treatment. Preferred alternatives for each process were selected for remedial design development.
- Project Engineer for the performance of a feasibility study for a hazardous waste landfill located at a Superfund site in Tennessee. The feasibility study focused on the characterization and quantification of landfill leachate consisting of chlorinated organic compounds as well as proprietary pesticide compounds. The remedial technologies which were evaluated included leachate collection alternatives, onsite treatment alternatives and offsite disposal methods. An analysis was performed for onsite treatment technologies which included constructed wetlands, biological fluidized bed reactor, and granular activated carbon adsorption. The technologies were assembled into four feasible remedial alternatives and treatability studies were recommended to confirm the suitability of selected processes.

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ROUX

PROFESSIONAL PROFILE

Alexander F. Policastro, P.E.

Senior Engineer

TECHNICAL SPECIALTIES

Engineering services including development and review of design drawings, implementation of design, development of technical specifications, review of construction submittals, development of new systems and construction management services. Designs have included petroleum bulk storage and fueling systems, wastewater treatment and remedial system design. Additional services including Operations and maintenance of active systems, permitting, project coordination, project scheduling, development of bid packages, cost estimating.

EXPERIENCE SUMMARY

Twelve years of experience: Senior Engineer with Roux Environmental Engineering & Geology, D.P.C.; Project Engineer/Project Manager with LiRo Engineering.

CREDENTIALS

B.S. Mechanical Engineering, Lafayette College, 2011

Fundamentals of Engineering E.I.T. Certification, 2011

Professional Engineer (NY), 2017

OSHA 40-Hour HAZWOPER Training, 2012

OSHA 30-Hour Construction Safety Training, 2017

OSHA 10-Hour Construction Safety Training, 2011

OSHA 8-Hour Hazardous Waste Refresher Training, 2021

NYSDEC Erosion and Sediment Control Training, 2020

NYCDOB 4-Hour Scaffold User, 2012

NYC DER-25 Training

KEY PROJECTS

- NYC Department of Design and Construction – Project Engineer responsible for the design of new fleet fueling and PBS systems as well as existing system upgrades, replacements, and closures of underground/aboveground storage tank facilities throughout the New York City area. Tank systems included motor and generator fueling systems, heating oil systems and fleet maintenance oil systems for the New York City Police Department, the New York City Fire Department, the New York City Department of Sanitation and the New York City Department of Parks and Recreation. Responsibilities included pre-design site investigation, regulatory compliance audits, equipment procurement, construction design, technical specification development, development of bid packages, and Construction Management services throughout construction.

- New York City Department of Design & Construction, Field Inspector responsible for Operations and Maintenance oversight and documentation of active remediation systems throughout Staten Island, Brooklyn, and Queens, New York. Responsibilities included new system design, oversight of contractor activities, system diagnosis and repair coordination, invoice and change order preparation, research and development of self-sustaining solar soil vapor extraction system. Active systems included dual-phase extraction, soil-vapor extraction and groundwater extraction.

- Town of New Castle DPW – Project Manager/Project Engineer for the replacement of the gasoline and diesel fleet fueling station and heating oil USTs. Installation included two (2) 5,000-gallon motor fuel ASTs with fueling island, one (1) 5,000-gallon heating oil AST with day tank for use with the facilities existing boiler systems as well as new tank monitoring system, fuel management system, and spill prevention /leak detection systems. Work also included removal of one (1) 8,000-gallon heating oil UST and Closure in place of two (2) 4,000-gallon motor fuel USTs. Responsible for the development of construction drawings, technical specifications, bid package, submittal review, construction scheduling, and estimating and coordination between client and awarded subcontractor.

- New York State Office of General Services, Storage Tank Facilities Replacement, New York, - Project Engineer – Responsible for the inspection of upgrades, replacements, and closures of underground and aboveground storage tank facilities throughout NYS as well as comprehensive record review in order to respond to an EPA request for information, throughout the New York State. PBS systems included gasoline, diesel, bio-fuels and heating oil USTs for various OGS sites throughout the state. Conducted onsite inspections of systems and records as well as designed system replacements and upgrades to existing Petroleum bulk storage systems to bring facilities into compliance. Work associated with project included, oversight of tank closures, writing closure reports, designing system removals, designing system replacements/upgrades, cost estimates and developing site drawings for OGS sites.

- Expressway55 – Brentwood, New York – Project manager responsible for response to a Notice of Violation relating to the facilities discharge permit. Tasks included coordination between client and regulatory agencies, diagnosis of existing water reclamation system and process flow systems, design and installation of new discharge treatment system including sediment filters and activated carbon filtration system as well as remediation of three outfall wells.

- NYC Mayor's Office of Environmental Remediation, Environmental Consulting Services - Auditor for a multi-site task order based contract to conduct USEPA-compliant Environmental Site Assessments (ESAs) and investigations of brownfield sites for the City of New York Mayor's Office of Environmental Remediation (OER) under a USEPA Brownfield Grant program. Audit of over 300 petroleum tank systems for compliance with State and Federal regulatory requirements. Responsible for conducting on-site audits of heating oil USTs, ASTs, and associated systems to determine compliance with EPA and NYSDEC regulations. Work associated with inspections included oversight

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Alexander F. Policastro, P.E.
Senior Engineer

of UST and AST Tightness Testing, review of records, compliance report writing, and recommendations for corrective measures.

- New York City Housing Preservation and Development, New York, Field Technician – Performed inspections of upgrades, replacements, and closures of underground and aboveground storage tank facilities throughout the New York City area. Conducted on-site audits of heating oil USTs, ASTs, and associated systems to determine compliance with EPA and NYSDEC regulations. Tank systems included heating oil USTs and piping systems for housing project sites throughout all five boroughs. Work associated with inspections included oversight of UST and AST Tightness Testing, review of records, report writing, and recommendations for corrective measures.
- New York Hudson River Park, Hurricane Sandy Response, Emergency Repair, New York – Conducted microbial assessment within ten buildings for water and mold intrusion as a result of flooding from super storm sandy. Project involved visual inspection, direct moisture readings in all effected building substrate, taking fungal spore air samples, tape lift samples, and bacterial swabs.
- New York City School Construction Authority, Hurricane Sandy Response, New York – Provided emergency environmental consulting services at many school buildings immediately after the storm. Due to the storm surge, buildings in the affected areas typically had flood damage to boiler rooms and service areas. Each location was assessed to determine the presence of spilled fuel oil and sewage, and damaged asbestos containing material. Developed remediation plans and coordinated with contractors to remove ACM and to contain and clean up spills.
- Town of Oyster Bay Department of Public Works, Liberty Industrial Finishing Site, Environmental Field Technician – Provided continuous dust monitoring and daily SWPPP inspections during excavation activities at a 7.5 acre portion of the former Liberty Industrial Finishing Superfund site located in Farmingdale, New York. Tasks included bi-weekly SWPPP inspections, waste tracking, screening soils with photoionization detector (PID), collecting soil samples for waste characterization and investigation of encountered underground tanks, and filing Notice of Termination and termination of the project.
- New York City Health & Hospitals Corporation, New York – Field inspector – Coordinated and conducted indoor air quality and mold investigations; conducted XRF testing of coatings as part of broader hazardous materials investigations for code compliance during capital improvement projects; performed emissions testing and air compliance reporting.

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ROUX

PROFESSIONAL PROFILE

Wendy Shen
Senior Engineer

TECHNICAL SPECIALTIES

Management of construction and remediation projects, including Brownfield redevelopment, building construction, excavation and disposal of impacted soil, engineering services for the investigation, design, construction, and operation and maintenance of remedial systems for the treatment of contaminated soil and groundwater.

EXPERIENCE SUMMARY

Twenty years of experience: Senior Engineer, Project Engineer, Staff Engineer, and Staff Assistant Engineer with Roux.

CREDENTIALS

M.S. in Environmental Engineering, Polytechnic University, Brooklyn, New York, 2001

B.S. in Chemical Engineering, Universidade Federal do Rio Grande do Sul, Brazil, 1997

OSHA 40 Hour Health and Safety Course, 2000

OSHA 8 Hour Refresher Courses

KEY PROJECTS

- Senior Engineer responsible for the management of investigation and remediation various Brownfields redevelopment sites containing hazardous and non-hazardous soils in New York City and surrounding. These projects included investigation, implementation of in situ waste characterization sampling program, Interim Remedial Measures, Remedial Action Work Plans, which included excavation of soils below grade and management of soils including transportation and disposal and coordination with various disposal facilities. Most of these sites were accepted into the New York City Office of Environmental Remediation (NYC OER) Brownfield Cleanup Program (BCP) or the New York State BCP.
- Senior Engineer responsible for scheduling at a large petroleum remediation project in Brooklyn, New York. Responsibilities included management of all present and future tasks to be completed including operations and maintenance, remedial investigation, design and construction, facility upgrades, special operations, permitting and compliance tracking, health and safety, audits/assessments, sampling and regulatory reporting.
- Project Engineer for the remediation of soil and groundwater at 100+ facilities owned and/or operated by various city agencies in New York City. Activities included preparation of administrative/contractual requirements, work plans, and monitoring reports, cost estimates, proposals, engineering support, and construction oversight.
- Project Engineer for the design of an air sparge and soil vapor extraction system in Andover, Massachusetts.
- Project Engineer for the remediation of soil and groundwater at a former chemical manufacturing company in Rensselaer, New York. Activities included construction oversight, preparation of reports including Feasibility Study, Interim Remedial Measures, Community Air Monitoring Plans, Sampling Plans, Bid Review, Invoice Review, and various field investigations.
- Project Engineer for an investigation and remediation at a former petroleum refinery in Buffalo, New York. Responsible for assisting in the preparation of multiple work plans and reports of results for field investigations including soil borings and sampling, well installation, and groundwater sampling. Also responsible for reviewing and assisting in the preparation of activities related to the operation of the remediation systems at the Site, including maps, evaluation summaries, plans and compliance monitoring reports.
- Project Engineer for the closure of an underground storage tank (UST) at a shipping facility in Queens, New York. Activities included preparation of cost estimate, work plans, and field management.
- Project and Resident Engineer for the soil remediation of the Captain's Cove Condominiums Site, a federal NPL site, located in Glen Cove, New York. Activities include: supervision of Contractor's activities, regulatory interaction, compile daily field reports, manage laboratory database for excavated and reclaimed soil, shop drawing review, change order preparation, and Health and Safety compliance. Site remediation was completed in September 2001 to accommodate site redevelopment as a commercial waterfront and operating seaport area. Currently managing OM&M groundwater monitoring program at the Site.
- Staff Engineer for a 450-gpm, dual-phase, product recovery system in Greenpoint, Brooklyn, New York. Tasks include: operation and maintenance of groundwater recovery and treatment system and free product recovery system. Also assisted in reviewing drawings and specs related to installation of aboveground storage tanks.
- Staff Engineer for the remediation of soil and groundwater at a former chemical company facility in Brooklyn, New York using a Soil Vapor Extraction and Air Sparging System. Tasks include: review of performance data for air sparge system, operation and maintenance for the SVE/AS System, progress report preparation, and monthly groundwater sampling.
- Staff Engineer for a divestment assessment at a service station in Stratford, Connecticut. Tasks include: oversight, soil sampling, FOIA investigation, coordination with subcontractor and regulatory agencies, and preparation of letters and reports.

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Senior Engineer

- Resident Engineer for the soil remediation at a former chemical company facility in Dayton, New Jersey. Activities include: construction oversight, Health and Safety compliance, field sampling, and completion report preparation.
- Responsible for assisting in preparing cost estimates, proposals, feasibility studies, interim remedial measures, remedial action plans, health and safety plans, and technical specifications for a variety of soil and groundwater remedial objectives.
- Student/Research Assistant at Laboratory of Polymers, Universidade Federal do Rio Grande do Sul, POA, Brazil. Performed experiments on the metallization of plastics using polyaniline.
- Intern/Researcher at Laboratory of Research and Development at a petrochemical company, Ipiranga Petroquimica, Brazil. Conducted laboratory tests involving additives used in polymers and responsible for quality control/assurance of products.

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APPENDIX B

Standard Operating Procedures, Laboratory Detection Limits for Emerging Contaminants and NYSDEC Guidance for Sampling Emerging Contaminants

NEW YORK STATE OF OPPORTUNITY.

Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

April 2023

Table of Contents

ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Data Assessment and Application to Site Cleanup Page 3	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	3/28/2023
Water Sample Results Page 3	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below.	NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These guidance values also include criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt).Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.	3/28/2023
Soil Sample Results Page 3	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values:	NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:	3/28/2023
Protection of Groundwater Page 3	PFOA (ppb) 1.1 PFOS (ppb) 3.7	PFOA (ppb) 0.8 PFOS (ppb) 1.0	3/28/2023

Citation and Page Number	Current Text	Corrected Text	Date
Footnote 2 Page 3	The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	3/28/2023
Testing for Imported Soil Page 4	If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.	If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.	3/28/2023
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021
Water Sample Results Page 9	"In addition, further assessment of water may be warranted if either of the following screening levels are met: a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L"	Deleted	6/15/2021

Citation and Page Number	Current Text	Corrected Text	Date
Routine Analysis, Page XX	Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP)… criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids).	Deleted	5/31/2022
Analysis and Reporting, Page XX	As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.	Deleted	5/31/2022
Routine Analysis, Page XX	LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media.	EPA Method 1633 is the procedure to use for environmental samples.	
Soil Sample Results, Page XX	Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6	
Appendix A	"Include in the text… LC-MS/MS for PFAS using methodologies based on EPA Method 537.1"	"Include in the text ….EPA Method 1633"	
Appendix A	"Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101"	Deleted	
Appendix B	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	

Citation and Page Number	Current Text	Corrected Text	Date
Appendix C	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix D	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix G		Updated to include all forty PFAS analytes in EPA Method 533	
Appendix H		Deleted	
Appendix I	Appendix I	Appendix H	
Appendix H	"These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report."	"These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER)."	
Appendix H	"The holding time is 14 days…"	"The holding time is 28 days…"	
Appendix H, Initial Calibration	"The initial calibration should contain a minimum of five standards for linear fit…"	"The initial calibration should contain a minimum of six standards for linear fit…"	
Appendix H, Initial Calibration	Linear fit calibration curves should have an R^2 value greater than 0.990.	Deleted	
Appendix H, Initial Calibration Verification	Initial Calibration Verification Section	Deleted	
Appendix H	secondary Ion Monitoring Section	Deleted	
Appendix H	Branched and Linear Isomers Section	Deleted	

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third-party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix G) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

EPA Method 1633 is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist. Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These human health criteria should also be applied to surface water that is used as a water supply. This guidance also includes criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	0.8	1.0

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These

[2] The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by EPA Method 1633
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
-
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the current SOP developed by the Division of Fish and Wildlife (DFW) entitled "General Fish Handling Procedures for Contaminant Analysis" (Ver. 8). This SOP should be followed when collecting fish for contaminant analysis. Note, however, that the Bureau of Ecosystem Health will not be supplying bags or tags. All supplies are the responsibility of the collector

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

Method 1633 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids and Tissue Samples by LC-MS/MS

References: Method 1633 - Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS (2nd Draft - June 2022)

DOD QSM (US Department of Defense Quality Systems Manual for Environmental Laboratories, version 5.4, 20221)

1. Scope and Application

Matrices: Drinking water, Non-potable Water, Tissues, Biosolids and Soil Matrices

Definitions: Refer to Alpha Analytical Quality Manual.

1.1 Method 1633 is for use in the Clean Water Act (CWA) for the determination of the per- and polyfluoroalkyl substances (PFAS) in Table 1 in aqueous, solid (soil, biosolids, sediment) and tissue samples by liquid chromatography/mass spectrometry (LC-MS/MS).

1.2 The method calibrates and quantifies PFAS analytes using isotopically labeled standards. Where linear and branched isomers are present in the sample and either qualitative or quantitative standards containing branched and linear isomers are commercially available, the PFAS analyte is reported as a single analyte consisting of the sum of the linear and branched isomer concentrations

1.3 This is a liquid chromatography/tandem mass spectrometry (LC/MS/MS) method for the determination of selected perfluorinated alkyl substances (PFAS) in Non-Drinking Water, tissue soil and biosolid Matrices. Accuracy and precision data have been generated for the compounds listed in Table 1.

1.4 The data report packages present the documentation of any method modification related to the samples tested. Depending upon the nature of the modification and the extent of intended use, the laboratory may be required to demonstrate that the modifications will produce equivalent results for the matrix. Approval of all method modifications is by one or more of the following laboratory personnel before performing the modification: Area Supervisor, Department Supervisor, Laboratory Director, or Quality Assurance Officer.

1.5 This method is restricted to use by or under the supervision of analysts experienced in the operation of the LC/MS/MS and in the interpretation of LC/MS/MS data. Each analyst must demonstrate the ability to generate acceptable results with this method by performing an initial demonstration of capability.

2. Summary of Method

2.1 Environmental samples are prepared and extracted using method-specific procedures. Sample extracts are subjected to cleanup procedures designed to remove interferences. Analyses of the sample extracts are conducted by LC-MS/MS in the multiple reaction monitoring (MRM) mode. Sample concentrations are determined by isotope dilution or extracted internal standard quantification using isotopically labeled compounds added to the samples before extraction.

2.2 Aqueous samples are spiked with isotopically labeled standards, extracted using solid-phase extraction (SPE) cartridges and undergo cleanup using carbon before analysis.

2.3 Solid samples are spiked with isotopically labeled standards, extracted into basic methanol, and cleaned up by carbon and SPE cartridges before analysis

2.4 Tissue samples are spiked with isotopically labeled standards, extracted in potassium hydroxide and acetonitrile followed by basic methanol, and cleaned up by carbon and SPE cartridges before analysis.

2.5 A sample extract is injected into an LC equipped with a C18 column that is interfaced to an MS/MS). The analytes are separated and identified by comparing the acquired mass spectra and retention times to reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the isotope dilution technique. Extracted Internal Standards (EIS) analytes are used to monitor the extraction efficiency of the method analytes.

2.6 Method Modifications from Reference

N/A

3. Reporting Limits

The reporting limit for PFAS's are listed in Table 8.

4. Interferences

4.1 PFAS standards, extracts and samples should not come in contact with any glass containers or pipettes as these analytes can potentially adsorb to glass surfaces. PFAS analyte and EIS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers.

4.2 Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample bottles and caps, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. The method analytes in this method can also be found in many common laboratory supplies and equipment, such as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, SPE sample transfer lines, etc. All items such as these must be routinely demonstrated to be free from interferences (less than 1/2 the RL for each method analyte) under the conditions of the analysis by analyzing laboratory reagent blanks as described in Section 9.1. Subtracting blank values from sample results is not permitted.

4.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature of the water. Humic and/or fulvic material can be co-extracted during SPE and high levels can cause enhancement and/or suppression in the electrospray ionization source or low recoveries on the SPE sorbent. Total organic carbon (TOC) is a good indicator of humic content of the sample.

4.4 SPE cartridges can be a source of interferences. The analysis of field and laboratory reagent blanks can provide important information regarding the presence or absence of such interferences. Brands and lots of SPE devices should be tested to ensure that contamination does not preclude analyte identification and quantitation.

5. Health and Safety

5.1 The toxicity or carcinogenicity of each reagent and standard used in this method is not fully established; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. A reference file of material safety data sheets is available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available in the Chemical Hygiene Plan.

5.2 All personnel handling environmental samples known to contain or to have been in contact with municipal waste must follow safety practices for handling known disease causative agents.

5.3 PFOA has been described as "likely to be carcinogenic to humans." Pure standard materials and stock standard solutions of these method analytes should be handled with suitable protection to skin and eyes, and care should be taken not to breathe the vapors or ingest the materials.

6. Sample Collection, Preservation, Shipping and Handling

6.1 Sample Collection for Aqueous Samples

6.1.1 Samples must be collected in two (2) 500-mL or 250-mL high density polyethylene (HDPE) container with an unlined plastic screw cap. All sample containers must have linerless HDPE or polypropylene caps.

6.1.2 The sample handler must wash their hands before sampling and wear nitrile gloves while filling and sealing the sample bottles. PFAS contamination during sampling can occur from a number of common sources, such as food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will aid in minimizing this type of accidental contamination of the samples.

6.1.3 Open the tap and allow the system to flush until the water temperature has stabilized (approximately 3 to 5 min). Collect samples from the flowing system.

6.1.4 Fill sample bottles. Samples do not need to be collected headspace free.

6.1.5 After collecting the sample and cap the bottle. Keep the sample sealed from time of collection until extraction.

6.1.6 Maintain all aqueous samples protected from light at 0 - 6 °C from the time of collection until shipped to the laboratory. Samples must be shipped as soon as practical with sufficient ice to maintain the sample temperature below 6 °C during transport and be received by the laboratory within 48 hours of collection. The laboratory must confirm that the sample temperature is 0 - 6 °C upon receipt. Once received by the laboratory, the samples must be stored at ≤ -20 °C until sample preparation.

6.2 Sample Collection for Soil and Sediment samples.

6.2.1 Grab samples are collected in polypropylene containers. Sample containers and contact surfaces containing PTFE shall be avoided. Samples should fill no more than ¾ full.

6.2.2 Maintain solid samples protected from light (in HDPE containers) at 0 - 6 °C from the time of collection until receipt at the laboratory. The laboratory must confirm that the sample temperature is 0 - 6 °C upon receipt. Once received by the laboratory, the samples must be stored at ≤ -20 °C until sample preparation.

6.3 Sample Collection for fish and other tissue samples

6.3.1 Once received by the laboratory, the samples must be maintained protected from light at ≤ -20 °C until prepared. Store unused samples in HDPE containers or wrapped in aluminum foil at ≤ -20 °C.

6.3.2 The nature of the tissues of interest may vary by project. Field sampling plans and protocols should explicitly state the samples to be collected and if any processing will be conducted in the field (e.g., filleting of whole fish or removal of organs). All field procedures must involve materials and equipment that have been shown to be free of PFAS.

6.4 Sample Preservation

Not applicable.

6.5 Sample Shipping

Samples must be chilled during shipment and must not exceed 0 – 6 °C during the first 48 hours after collection. Sample temperature must be confirmed to be at or below 0 – 6 °C when the samples are received at the laboratory. Samples stored in the lab must be held at or below 6 °C until extraction but should not be frozen.

NOTE: Samples that are significantly above 0 – 6 ° C, at the time of collection, may need to be iced or refrigerated for a period of time, in order to chill them prior to shipping. This will allow them to be shipped with sufficient ice to meet the above requirements.

6.6 Sample Handling

6.6.1 Aqueous samples (including leachates) should be analyzed as soon as possible; however, samples may be held in the laboratory for up to 90 days from collection, when stored at ≤ -20 °C and protected from the light. When stored at 0 - 6 °C and protected from the light, aqueous samples may be held for up to 28 days, with the caveat that issues were observed with certain perfluorooctane sulfonamide ethanols and perfluorooctane sulfonamidoacetic acids after 7 days. These issues are more likely to elevate the observed concentrations of other PFAS compounds via the transformation of these precursors if they are present in the sample.

6.6.2 Solid samples (soils and sediments) and tissue samples may be held for up to 90 days, if stored by the laboratory in the dark at either 0 - 6 °C or ≤ -20 °C, with the caveat that samples may need to be extracted as soon as possible if NFDHA is an important analyte.

6.6.3 Biosolids samples may be held for up to 90 days, if stored by the laboratory in the dark at 0 - 6 °C or at -20 °C. Because microbiological activity in biosolids samples at 0 - 6 °C may lead to production of gases which may cause the sample to be expelled from the container when it is opened, as well as producing noxious odors, EPA recommends that samples be frozen if they need to be stored for more than a few days before extraction. Store sample extracts in the dark at less than 0 - 4 °C until analyzed. If stored in the dark at less than 0 - 4 °C, sample extracts may be stored for up to 90 days, with the caveat that issues were observed for some ether sulfonates after 28 days. These issues may elevate the observed concentrations of the ether sulfonates in the extract over time. Samples may need to be extracted as soon as possible if NFDHA is an important analyte.

7. Equipment and Supplies

7.1 SAMPLE CONTAINERS – 500-mL or 250-mL high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.2 SAMPLE JARS – 8-ounce wide mouth high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.3 POLYPROPYLENE BOTTLES – 4-mL narrow-mouth polypropylene bottles.

7.4 CENTRIFUGE TUBES – 50-mL conical polypropylene tubes with polypropylene screw caps for storing standard solutions and for collection of the extracts.

7.5 AUTOSAMPLER VIALS – Polypropylene 0.7-mL autosampler vials with polypropylene caps.

7.5.1 NOTE: Polypropylene vials and caps are necessary to prevent contamination of the sample from PTFE coated septa. However, polypropylene caps do not reseal, so evaporation occurs after injection. Thus, multiple injections from the same vial are not possible.

7.6 POLYPROPYLENE GRADUATED CYLINDERS – Suggested sizes include 25, 50, 100 and 1000-mL cylinders.

7.7 Auto Pipets – Suggested sizes include 5, 10, 25, 50, 100, 250, 500, 1000, 5000 and 10,000-µls.

7.8 PLASTIC PIPETS – Polypropylene or polyethylene disposable pipets.

7.9 Silanized glass wool (Sigma-Aldrich, Cat # 20411 or equivalent) – store in a clean glass jar and rinsed with methanol (2 times) prior to use.

7.10 Disposable syringe filter, 25-mm, 0.2-µm Nylon membrane, PALL/Acrodisc or equivalent

7.11 Variable volume pipettes with disposable HDPE or polypropylene tips (10 µL to 5 mL) used for preparation of calibration standards and spiked samples.

7.12 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.0001 g.

7.13 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.1 g.

7.14 SOLID PHASE EXTRACTION (SPE) APPARATUS FOR USING CARTRIDGES

7.14.1 SPE CARTRIDGES – (Waters Oasis WAX 150 mg, Cat # 186002493 or equivalent). The SPE sorbent must have a pKa above 8 so that it remains positively charged during the extraction.

7.14.1.1 Note: SPE cartridges with different bed volume (e.g., 500 mg) may be used; however, the laboratory must demonstrate that the bed volume does not negatively affect analyte absorption and elution, by performing the initial demonstration of capability analyses described in Section.

7.14.2 VACUUM EXTRACTION MANIFOLD – A manual vacuum manifold with large volume sampler for cartridge extractions, or an automatic/robotic sample preparation system designed for use with SPE cartridges, may be used if all QC requirements discussed in Section 9 are met. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. Care must be taken with automated SPE systems to ensure the PTFE commonly used in these systems does not contribute to unacceptable analyte concentrations in the MB.

7.14.3 SAMPLE DELIVERY SYSTEM – Use of a polypropylene transfer tube system, which transfers the sample directly from the sample container to the SPE cartridge, is recommended, but not mandatory. Standard extraction manifolds come equipped with PTFE transfer tube systems. These can be replaced with 1/8" O.D. x 1/16" I.D. polypropylene or polyethylene tubing cut to an appropriate length to ensure no sample contamination from the sample transfer lines. Other types of non-PTFE tubing may be used provided it meets the MB and LCS QC requirements.

7.15 EXTRACT CONCENTRATION SYSTEM – Extracts are concentrated by evaporation with nitrogen using a water bath set no higher than 55 °C.

7.16 LABORATORY OR ASPIRATOR VACUUM SYSTEM – Sufficient capacity to maintain a vacuum of approximately 10 to 15 inches of mercury for extraction cartridges.

7.17 LIQUID CHROMATOGRAPHY (LC)/TANDEM MASS SPECTROMETER (MS/MS) WITH DATA SYSTEM

7.17.1 LC SYSTEM – Instrument capable of reproducibly injecting up to 10-µL aliquots and performing binary linear gradients at a constant flow rate near the flow rate used for development of this method (0.4 mL/min). The LC must be capable of pumping the water/methanol mobile phase without the use of a degasser which pulls vacuum on the mobile phase bottle (other types of degassers are acceptable). Degassers which pull vacuum on the mobile phase bottle will volatilize the ammonium acetate mobile phase causing the analyte peaks to shift to earlier retention times over the course of the analysis batch. The usage of a column heater is optional.

7.17.2 LC/TANDEM MASS SPECTROMETER – The LC/MS/MS must be capable of negative ion electrospray ionization (ESI) near the suggested LC flow rate of 0.4 mL/min. The system must be capable of performing MS/MS to produce unique product ions for the method analytes within specified retention time segments. A minimum of 10 scans across the chromatographic peak is required to ensure adequate precision.

7.17.3 DATA SYSTEM – An interfaced data system is required to acquire, store, reduce, and output mass spectral data. The computer software should have the capability of processing stored LC/MS/MS data by recognizing an LC peak within any given retention time window. The software must allow integration of the ion

abundance of any specific ion within specified time or scan number limits. The software must be able to calculate relative response factors, construct linear regressions or quadratic calibration curves, and calculate analyte concentrations.

7.17.4 INSTRUMENT COLUMNS

7.17.4.1 ANALYTICAL: C18 column, 1.7 µm, 50 x 2.1 mm (Waters Acquity UPLC® BEH or equivalent)

7.17.4.2 OPTIONAL GUARD COLUMN: (Phenomenex Kinetex® Evo C18 or equivalent)

8. Reagents and Standards

8.1 GASES, REAGENTS, AND SOLVENTS – Reagent grade or better chemicals must be used.

8.1.1 REAGENT WATER – Purified water which does not contain any measurable quantities of any method analytes or interfering compounds greater than 1/2 the RL for each method analyte of interest. Prior to daily use, at least 3 L of reagent water should be flushed from the purification system to rinse out any build-up of analytes in the system's tubing.

8.1.2 METHANOL (CH_3OH, CAS#: 67-56-1) – High purity, demonstrated to be free of analytes and interferences.

8.1.3 AMMONIUM ACETATE ($NH_4C_2H_3O_2$, CAS#: 631-61-8) – High purity, demonstrated to be free of analytes and interferences.

8.1.4 ACETIC ACID (H_3CCOOH, CAS#: 64-19-7) - High purity, demonstrated to be free of analytes and interferences.

8.1.5 1M AMMONIUM ACETATE/REAGENT WATER – High purity, demonstrated to be free of analytes and interferences.

8.1.6 2mM AMMONIUM ACETATE/METHANOL:WATER (5:95) – To prepare, mix 2 ml of 1M AMMONIUM ACETATE,1 ml ACETIC ACID and 50 ml METHANOL into l Liter of REAGENT WATER.

8.1.7 ACETONITRILE – UPLC grade or equivalent, store at room temperature

8.1.8 TOLUENE – HPLC grade or equivalent.

8.1.9 ACETONE – pesticide grade or equivalent

8.1.10 AMMONIUM ACETATE – (Caledon Ultra LC/MS grade or equivalent

8.1.11 AMMONIUM HYDROXIDE (NH_3, CAS#: 1336-21-6) – High purity, demonstrated to be free of analytes and interferences.

8.1.12 METHANOLIC AMMONIUM HYDROXIDE (0.3%) - add ammonium hydroxide (1 mL, 30%) to methanol (99 mL), store at room temperature, replace after 1 month

8.1.13 METHANOLIC AMMONIUM HYDROXIDE (1%) - add ammonium hydroxide (3.3 mL, 30%) to methanol (97 mL), store at room temperature, replace after 1 month

8.1.14 METHANOLIC AMMONIUM HYDROXIDE (2%) - add ammonium hydroxide (6.6 mL, 30%) to methanol (93.4 mL), store at room temperature, replace after 1 month

8.1.15 METHANOLIC POTASSIUM HYDROXIDE (0.05 M) – add 3.3 g of potassium hydroxide to 1 L of methanol, store at room temperature, replace after 3 months

8.1.16 METHANOL WITH 4% WATER, 1% AMMONIUM HYDROXIDE AND 0.625% ACETIC ACID - add ammonium hydroxide (3.3 mL, 30%), reagent water (1.7 mL) and acetic acid (0.625 mL) to methanol (92 mL), store at room temperature, replace after 1 month. This solution is used to prepare the instrument blank and calibration standards (Section 8.3.2).

8.1.17 FORMIC ACID – (greater than 96% purity or equivalent).

8.1.18 FORMIC ACID (aqueous, 0.1 M) - dissolve formic acid (4.6 g) in reagent water (1 L), store at room temperature, replace after 2 years

8.1.19 FORMIC ACID (aqueous, 0.3 M) - dissolve formic acid (13.8 g) in reagent water (1 L), store at room temperature, replace after 2 years

8.1.20 FORMIC ACID (aqueous, 5% v/v) - mix 5 mL formic acid with 95 mL reagent water, store at room temperature, replace after 2 years

8.1.21 FORMIC ACID (methanolic 1:1, 0.1 M formic acid/methanol) - mix equal volumes of methanol and 0.1 M formic acid, store at room temperature, replace after 2 years

8.1.22 FORMIC ACID (aqueous, 50% v/v) - mix 50 mL formic acid with 50 mL reagent water, store at room temperature, replace after 2 years

8.1.23 POTASSIUM HYDROXIDE – certified ACS or equivalent

8.1.24 CARBON - – EnviCarb® 1-M-USP or equivalent, verified by lot number before use, store at room temperature. Loose carbon allows for better adsorption of interferent organics. Note: The single-laboratory validation laboratory achieved better performance with loose carbon than carbon cartridges. Loose carbon will be used for the multi-laboratory validation to set statistically based method criteria.

8.1.25 NITROGEN – Used for the following purposes: Nitrogen aids in aerosol generation of the ESI liquid spray and is used as collision gas in some MS/MS instruments. The nitrogen used should meet or exceed instrument

manufacturer's specifications. In addition, Nitrogen is used to concentrate sample extracts (Ultra High Purity or equivalent).

8.1.26 ARGON – Used as collision gas in some MS/MS instruments. Argon should meet or exceed instrument manufacturer's specifications. Nitrogen gas may be used as the collision gas provided sufficient sensitivity (product ion formation) is achieved.

8.2 REFERENCE MATRICES - Matrices in which PFAS and interfering compounds are not detected by this method. These matrices are to be used to prepare the batch QC samples.

8.2.1 Reagent water - purified water, Type I

8.2.2 Solid reference matrix Ottawa Sand or equivalent

8.2.3 Tissue Reference matrix – Cod loin or other animal tissue demonstrated to be PFAS free

8.3 STANDARD SOLUTIONS – When a compound purity is assayed to be 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard. PFAS analyte and IS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers and are stored at ≤4 °C. Standards for sample fortification generally should be prepared in the smallest volume that can be accurately measured to minimize the addition of excess organic solvent to aqueous samples.

8.3.1 Stock standards and diluted stock standards are stored at ≤4 °C. Prepare a spiking solution, containing the method analytes listed in Table 1, in methanol from prime stocks. The solution is used to prepare the calibration standards and to spike the known reference QC samples that are analyzed with every batch. Quantitative standards containing a mixture of branched and linear isomers must be used for method analytes if they are commercially available. Currently, these include PFOS, PFHxS, NEtFOSAA, and NMeFOSAA.

8.3.2 Calibration standard solutions – A series of calibration solutions containing the target analytes and the Labeled extracted internal standards (EIS) and non-extracted internal standards (NIS) is used to establish the initial calibration of the analytical instrument. Table 4 represents the concentrations of the native, EIS and NIS analytes of the calibration curve. Calibration standard solutions are made using the solution described in section 8.1.16.

8.3.3 ISOTOPE DILUTION EXTRACTED INTERNAL STANDARD (EIS) – Isotopically labelled analogs of the target analytes to be used for the quantification of target analytes. EIS stock standard solutions are purchased in glass ampoules and are stored in accordance with the manufacturer's recommendations. The EIS stock solution to be used for the fortification of samples and QC in accordance with the isotope dilution procedure. Table 2 represents the EIS concentrations and nominal sample amounts added to each field sample and QC element.

8.3.4 ISOTOPE DILUTION NON-EXTRACTED INTERNAL STANDARDS (NIS) – Isotopically labelled analogs to be added post extraction for the measurement of EIS extraction efficiency and is added to the final volume of all extractions. Table 3 represents the EIS concentrations and nominal sample amounts added to each field sample and QC element.

9. Quality Control

9.1 Method Blank

9.1.1 A Method Blank (MB) is required with each extraction batch to confirm that potential background contaminants are not interfering with the identification or quantitation of method analytes. An aliquot of reagent water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents and standards. Prep and analyze a MB for every 20 samples. If the MB produces a peak within the retention time window of any analyte that would prevent the determination of that analyte, determine the source of contamination, and eliminate the interference before processing samples. Background contamination must be reduced to an acceptable level before proceeding. Background from method analytes or other contaminants that interfere with the measurement of method analytes must be below the RL. If the method analytes are detected in the MB at concentrations equal to or greater than this level, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.

9.2 Laboratory Control Sample (LCS)

9.2.1 Low Level LCS or OPR (Ongoing Precision Recovery) sample is required with each extraction batch. A LLCS or OPR samples is a method blank spiked with known quantities of analytes. The fortified concentration of the LCS is spiked at 2X the LOQ. Default limits of 70-130% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation:

9.2.2 An LCS or OPR (Ongoing Precision Recovery) sample is required with each extraction batch. A LCS or OPR samples is a method blank spiked with known quantities of analytes. The fortified concentration of the LCS is spiked at the midpoint of the calibration curve. Default limits of 70-130% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation:

$$\%R = \frac{A \times 100}{B}$$

Where:

A = measured concentration in the fortified sample
B =fortification concentration.

9.1.1 Where applicable, in the absence of additional sample volume required to perform matrix specific QC, LCSD's are to be extracted and analyzed. The concentration and analyte recovery criteria for the LCSD must be the same as the batch LCS The RSD's must fall within ≤30% of the true value for medium and high-level replicates, and ≤50% for low level replicates. Calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation:

$$RPD = \frac{|LCS - LCSD|}{(LCS + LCSD) / 2} \times 100$$

9.1.2 If the LCS and or LCSD results do not meet these criteria for method analytes, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.

9.3 Non-extracted Internal Standard Area (NIS)

Each time an initial calibration is performed, use the data from all the initial calibration standards used to meet the linearity test in Section 10.3.3.3 to calculate the mean area response for each of the NIS compounds, using the equation below.

$$\text{Mean Area}_{NISi} = \sum AREA_{NISi} / n$$

where:

AreaNISi = Area counts for the ith NIS, where i ranges from 1 to 7, for the seven NIS compounds listed in Table 1
n = The number of ICAL standards (the default value is n = 6). If a different number of standards is used for the ICAL, for example, to increase the calibration range or by dropping a point at either end of the range to meet the linearity criterion, change 6 to match the actual number of standards used)
Record the mean areas for each NIS for use in evaluating results for sample analyses. There is no acceptance criterion associated with the mean NIS area data.

9.4 Extracted Internal Standards (EIS)

9.4.1 The EIS standard is fortified into all samples, CCVs, MBs, LCSs, MSs, MSDs, FD, and FRB prior to extraction. It is also added to the CAL standards. The EIS is a means of assessing method performance from extraction to final chromatographic measurement. Calculate the recovery (%R) for the EIS using the following equation:

$$\%R = (A / B) \times 100$$

Where:
A = calculated EIS concentration for the QC or Field Sample
B = fortified concentration of the EIS.

9.4.2 Default limits of 50-150% may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. A low or high percent recovery for a sample, blank, or CCV does not require discarding the analytical data but it may indicate a potential problem with future analytical data. When EIS recovery from a sample, blank, or CCV are outside control limits, check 1) calculations to locate possible errors, 2) standard solutions for degradation, 3) contamination, and 4) instrument performance. For CCVs and QC elements spiked with all target analytes, if the recovery of the corresponding target analytes meet the acceptance criteria for the EIS in question, the data can be used but all potential

biases in the recovery of the EIS must be documented in the sample report. If the associated target analytes do not meet the acceptance criteria, the data must be reanalyzed.

9.5 Matrix Spike (MS/MSD)

9.5.1 Analysis of an MS is prepared one per preparation batch (if required).

9.5.2 Aliquots of field samples that have been fortified with a known concentration of target compounds, prior to sample preparation and extraction, and analyzed to measure the effect of matrix interferences. The use of MS/MSD samples is generally not required in isotope dilution methods because the labeled compounds added to every sample provide more performance data than spiking a single sample in each preparation batch. Aliquots of field samples

9.5.3 Analyte recoveries may exhibit matrix bias. For samples fortified at or above their native concentration, recoveries should range between 50-150%. If the accuracy of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCS, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.6 Laboratory Duplicate

9.6.1 FIELD DUPLICATE OR LABORATORY FORTIFIED SAMPLE MATRIX DUPLICATE (FD or MSD) – Within each extraction batch (not to exceed 20 Field Samples), a minimum of one FD or MSD must be analyzed. Duplicates check the precision associated with sample collection, preservation, storage, and laboratory procedures. If method analytes are not routinely observed in Field Samples, an MSD should be analyzed rather than an FD.

9.6.2 Calculate the relative percent difference (*RPD*) for duplicate measurements (*FD1* and *FD2*) using the equation:

$$RPD = \frac{|FD1 - FD2|}{(FD1 + FD2) / 2} \times 100$$

9.6.3 RPDs for FDs should be ≤30%. Greater variability may be observed when FDs have analyte concentrations that are within a factor of 2 of the RL. At these concentrations, FDs should have RPDs that are ≤50%. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the CCV, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.6.4 If an MSD is analyzed instead of a FD, calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation:

$$RPD = \frac{|MS - MSD|}{(MS + MSD) / 2} \times 100$$

9.6.5 RPDs for duplicate MSs should be ≤30% for samples fortified at or above their native concentration. Greater variability may be observed when MSs are fortified at analyte concentrations that are within a factor of 2 of the RL. MSs fortified at these concentrations should have RPDs that are ≤50% for samples fortified at or above their native concentration. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCSD where applicable, the result is judged to be matrix biased. If no LCSD is present, the associated MS and MSD are to be re-analyzed to determine if any analytical has occurred. If the resulting RPDs are still outside control limits, the result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.7 Bile Salt Interference Check

9.7.1 The laboratory must analyze a TDCA standard after the initial calibration, prior to the analysis of tissue samples, to check for interferences caused by bile salts. If an interference is present, the chromatographic conditions must be modified to eliminate the interference from TDCA (e.g., changing the retention time of TDCA such that it falls outside the

9.8 Initial Calibration Verification (ICV)

9.8.1 After each ICAL, analyze a QCS sample from a source different from the source of the CAL standards. If a second vendor is not available, then a different lot of the standard should be used. The QCS should be prepared and analyzed just like a CCV. Acceptance criteria for the QCS are identical to the CCVs; the calculated amount for each analyte must be ± 30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedure to locate and correct the problem.

9.9 Instrument Sensitivity Check (ISC)

9.9.1 At the start of each 12-hour shift, analyze a standard at the LOQ. The signal-to-noise ratio of the ISC standard must be greater than or equal to 3:1. If the requirements cannot be met, the problem must be corrected before analyses can proceed

9.10 Continuing Calibration Verification (CCV)

9.10.1 CCV Standards must be analyzed at the beginning of each analysis batch, after every 10 Field Samples, and at the end of the analysis batch.

9.10.2 The recovery of native and isotopically labeled compounds for the CVs must be within 70 - 130%

9.10.3

9.11 Method-specific Quality Control Samples

9.11.1 Instrument Blank – During the analysis of a batch of samples, a solvent blank is analyzed after samples containing high level of target compounds (e.g., calibration, CV) to monitor carryover from the previous injection. The injection blank consists of the solution in

Section 8.1.16 fortified with the EIS and NIS for quantitation purposes.

9.12 Example Method Sequence

- INSTRUMENT BLANK
- INSTRUMENT SENSITIVITY CHECK
- CALIBRATION VERIFICATION STANDARD
- QUALITATIVE IDENTIFICATION STANDARDS
- TDCA STANDARD (only if analyzing tissues)
- INSTRUMENT BLANK
- METHOD BLANK
- LOW-LEVEL LCS/OPR
- OPR/LCS
- SAMPLE (10 or fewer)
- CALIBRATION VERIFICATION STANDARD
- INSTRUMENT BLANK
- SAMPLE (10 or fewer)
- CALIBRATION VERIFICATION STANDARD
- INSTRUMENT BLANK

10. Procedure

10.1 Equipment Set-up

10.1.1 This procedure may be performed manually or in an automated mode using a robotic or automatic sample preparation device. If an automated system is used to prepare samples, follow the manufacturer's operating instructions, but all extraction and elution steps must be the same as in the manual procedure. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. If an automated system is used, the MBs should be rotated among the ports to ensure that all the valves and tubing meet the MB requirements.

10.1.2 Some of the PFAS's adsorb to surfaces, including polypropylene. Therefore, the aqueous sample bottles must be rinsed with the elution solvent whether extractions are performed manually or by automation. The bottle rinse is passed through the cartridge to elute the method analytes and is then collected.

10.1.3 The SPE cartridges and sample bottles described in this section are designed as single use items and should be discarded after use. They may not be refurbished for reuse in subsequent analyses.

10.1.4 All SPE apparatus, including manifolds, tubing and sample ports must be thoroughly rinsed following each use with 1% methanolic ammonium hydroxide, followed by Methanol and then DI water. Additionally, sample manifold ports and transfer tubing should be inspected regularly for signs of wear and/or discoloration. When such observations are made, the associated components should be replaced.

10.1.5 Prior to the start of any extraction, sample site information must be evaluated for any potentially high level PFAS concentrations or sample matrix irregularities that may impact the extraction process. If such samples are identified, aqueous samples may be pre-screened via direct aqueous injection prior to analysis to estimate the potential PFAS concentrations present.

10.1.6 To perform a direct aqueous injection (DAI) screen, the sample should be inverted several times to try and evenly disperse any organic matter present. A 1 ml aliquot (or less depending on the matrix) is to be taken from the parent sample, volume adjusted to 1 ml with reagent water if less than 1ml, fortified with EIS and NIS spiking solutions to match the concentrations of an extracted sample (typically 5 µl per 1 ml DAI), and then analyzed under the same analytical conditions as field samples.

10.2 Sample Preparation of Aqueous Samples

10.2.1 Samples are preserved, collected, and stored as presented in Section 6.

10.2.2 Determine sample volume. Weigh all samples to the nearest 1g. If visible sediment is present, centrifuge and decant into a new HDPE bottle and record the weight of the new container.

NOTE: Some of the PFAS's adsorb to surfaces, thus the sample volume may not be transferred to a graduated cylinder for volume measurement.

10.2.3 The MB, LCS and FRB may be prepared by measuring reagent water with a polypropylene graduated cylinder or filling an HDPE sample bottle to near the top.

10.2.4 Check that the pH is 6.5 ± 0.5. If necessary, adjust pH with 50% formic acid or ammonium hydroxide and 3% aqueous ammonium hydroxide. The extract is now ready for solid-phase extraction (SPE) and cleanup.

10.2.5 Add 20 µL of the EIS to each sample and QC, cap and invert to mix.

10.2.6 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.3 Sample Prep and Extraction Protocol for Soils, Solids and Sediments.

10.3.1 Homogenize and weigh 5 grams of sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 5 grams of clean sand is used.

10.3.1.1 For Biosolids and other complex matrices, a small aliquot may be required due to co-extracted matrix interferences.

10.3.1.2 For batch QC samples using 5 g of reference solid, add 2.5 g of reagent water. The addition of reagent water to the sand provides a matrix closer in composition to real-world samples.

10.3.2 Add 20 µL of the EIS to each sample and QC.

10.3.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.3.4 Vortex the samples to evenly disperse the spiking solutions and allow to equilibrate for 30 minutes.

10.3.5 To all samples, add 10 ml of 0.3% methanolic ammonium hydroxide, cap, vortex for 25 seconds.

10.3.6 Following mixing, shake each sample for 30 minutes on a shaker table.

10.3.7 Centrifuge each sample at 2800RPM for 10 minutes.

10.3.8 Remove the supernatant and transfer to a clean 50 ml polypropylene centrifuge tube.

10.3.9 Repeat steps 10.3.4 to 10.3.7, with 15 ml of 0.3% methanolic ammonium hydroxide, combining the supernatants.

10.3.10 Add 5ml of 0.3% methanolic ammonium hydroxide to the sample, vortex for 25 seconds and centrifuge each sample at 2800RPM for 10 minutes.

10.3.11 Remove the supernatant and transfer to the same 50 ml polypropylene centrifuge tube containing eluates from the previous cycles.

10.3.12 Add 10 mg of carbon to the combined extract, mix by occasional hand shaking for no more than five minutes and then centrifuge at 2800 rpm for 10 minutes. Immediately decant the extract into a 50 ml polypropylene centrifuge tube.

10.3.13 Dilute to approximately 35 mL with reagent water. Samples containing more than 50% water may yield extracts that are greater than 35 mL in volume; therefore, do not add water to these. Determine the water content in the sample as follows (percent moisture is determined from the % solids):

Water Content in Sample = (Sample Weight * Percent moisture) / 100

10.3.14 Concentrate each extract at approximately 55 °C with a gentle N2 flow to a final volume that is based on the water content of the sample (see table below). Allow extracts to concentrate for 10 minutes, then mix (by vortex if the volume is < 20. Continue concentrating and mixing every 5 minutes until the extract has been reduced to the required volume as specified in the table below. If the extract volume appears to stop dropping, the concentration must be stopped and the volume at which it was stopped recorded.

Water Content in Sample	Concentrated Final Volume
< 5 grams	15 ml
5-8 grams	15-20 ml
8-9 grams	20-22.5 ml
9-10 grams	22.5-25 ml

10.3.15 Add 40 - 50 mL of reagent water to the extract and vortex. Check that the pH is 6.5 ±0.5 and adjust as necessary with 50% formic acid or 30% ammonium

hydroxide, or with 5% formic acid and 3% aqueous ammonium hydroxide. The extracts are ready for SPE and cleanup.

10.4 Sample Prep and Extraction Protocol for Tissues.

10.4.1 Homogenize and weigh 2 grams of sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 2 grams of clean tissue is used.

10.4.2 Add 20 µL of the EIS PDS to each sample and QC.

10.4.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.4.4 Add 10 mL of 0.05M KOH in methanol to each sample. Vortex to disperse the tissue then place tubes on a mixing table to extract for at 16 hours. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant in a 50-mL polypropylene centrifuge tube.

10.4.5 Add 10 mL of acetonitrile to remaining tissue in the 50-mL centrifuge tube, vortex to mix and disperse the tissue. Sonicate for 30 minutes. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant, adding it to the 50-mL centrifuge tube containing the initial extract.

10.4.6 Add 5 mL of 0.05M KOH in methanol to the remaining sample in each centrifuge tube. Vortex to disperse the tissue and hand mix briefly. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant, adding it to the 50-mL centrifuge tube containing the first two extracts.

10.4.7 Add 10 mg of carbon to the combined extract, mix by occasional hand shaking over a period of no more than five minutes and then centrifuge at 2800 rpm for 10 minutes. Immediately decant the extract into a 50-mL centrifuge tube.

10.4.8 Add 1 mL of reagent water to each tube and concentrate each extract at approximately 55 °C with a gentle N2 flow to a final volume of 2.5 ml.

10.4.9 Add reagent water to each evaporation/concentrator tube to dilute the extracts to 50 mL. Check that the pH = 6.5 ± 0.5 and adjust as needed with 50% formic acid, or ammonium hydroxide or with 5% formic acid and 3% aqueous ammonium hydroxide. The extracts are ready for SPE and cleanup.

10.5 SPE Extract: All matrices

10.5.1 Pack clean silanized glass wool to half the height of the WAX SPE cartridge barrel.

10.5.2 Pre-condition the cartridges by washing them with 3 X 5 mL of 1% methanolic ammonium hydroxide, discarding the wash volumes.

10.5.3 Rinse the cartridge with 5 mL of 0.3M formic acid, allowing the cartridge to drain using gravity only, discarding the rinse volume. Do not allow the cartridge to go dry

10.5.4 Adjust the vacuum so that the approximate flow rate is ~5 mL/min and load the sample across the cartridge. Do not allow the cartridge to go dry before all the sample has passed through.

10.5.5 Once all the sample has passed across the cartridge, rinse the walls of the reservoir with 2 X 5 mL reagent water, loading the rinse across the cartridge.

10.5.6 Rinse the walls of the reservoir with 5 mL of 1:1 0.1M formic acid/methanol and pass the rinse through the cartridge using vacuum. Dry the cartridge by pulling air through for 15 seconds.

10.5.7 Rinse the inside of the sample bottle with 5 mL of 1% methanolic ammonium hydroxide. Use vacuum to pull the elution solvent through the cartridge and into the collection tubes. When the cartridge bed and glass wool are submerged, stop the cartridge flow by closing the valve, keeping the sorbent bed and wool submerged.

10.5.8 Let the wetted sorbent bed and wool soak for 1 minute.

10.5.9 Open the cartridge valve and collect the eluate into a 15 ml polypropylene collection tube.

10.5.10 Add 25 µL of concentrated acetic acid to each sample eluted in the collection tubes and vortex to mix.

10.5.11 Add 10 mg of carbon to each sample and batch QC extract, using a 10-mg scoop. Handshake occasionally for no more than 5 minutes. It is important to minimize the time the sample extract is in contact with the carbon. Immediately vortex (30 seconds) and centrifuge at 2800 rpm for 10 minutes.

10.5.12 Add NIS solution to a clean collection tube. Place a syringe filter (25-mm filter, 0.2-µm nylon membrane) on a 5-mL polypropylene syringe. Take the plunger out and carefully decant the sample supernatant into the syringe barrel. Replace the plunger and filter the entire extract into the new collection tube containing the NIS.

10.5.13 Vortex to mix and transfer a portion of the extract into a .7-mL polypropylene LC vial for LC-MS/MS analysis. Cap the collection tube containing the remaining extract and store at 4 °C

10.6 Sample Volume Determination

10.6.1 If using weight to determine volume, weigh the empty bottle to the nearest 1 g and determine the sample weight by subtraction of the empty bottle weight from the original sample weight. Assume a sample density of 1.0 g/mL. In either case, the sample volume will be used in the final calculations of the analyte concentration.

10.7 Initial Calibration - Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. After the initial calibration is successful, a CCV is required at the beginning and end of each period in which analyses are performed, and after every tenth Field Sample.

10.7.1 ESI-MS/MS TUNE

10.7.1.1 Calibrate the mass scale of the MS with the calibration compounds and procedures prescribed by the manufacturer.

10.7.1.2 Optimize the [M-H]- or [M-CO_2]- for each method analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (0.4 mL/min). This tune can be done on a mix of the method analytes. The MS parameters (voltages, temperatures, gas flows, etc.) are varied until optimal analyte responses are determined.

The method analytes may have different optima requiring some compromise between the optima.

The Mass spec conditions found in Table 7 show the Sciex Triple Quad 5500+ operation conditions used in this method.

10.7.1.3 Optimize the product ion for each analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (approximately 0.4 mL/min). This tune can be done on a mix of the method analytes. The MS/MS parameters (collision gas pressure, collision energy, etc.) are varied until optimal analyte responses are determined. Typically, the carboxylic acids have very similar MS/MS conditions, and the sulfonic acids have similar MS/MS conditions.

The conditions found on table 5 are representative of expected tune optimizations for each analyte. If conditions other the ones close to the values provided in table 5 are achieved, the process should be re-performed and/or instrument maintenance performed to resolve the problem.

10.7.2 Establish LC operating parameters that optimize resolution and peak shape. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted.

Table 6 represents the operation conditions of a Sciex Exion LC system when running this method.

10.7.3 Inject 2µl of a mid-level CAL standard under LC/MS conditions to obtain the retention times of each method analyte. Divide the chromatogram into retention time windows each of which contains one or more chromatographic peaks. During MS/MS analysis, fragment a small number of selected precursor ions ([M-H]-) for the analytes in each window and choose the most abundant product ion. For maximum sensitivity, small mass windows of ±0.5 daltons around the product ion mass were used for quantitation.

10.7.4 Inject a mid-level CAL standard under optimized LC/MS/MS conditions to ensure that each method analyte is observed in its MS/MS window and that there are at least 10 scans across the peak for optimum precision.

NOTE: PFHxS, PFOS, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 7 due to chromatographic resolution of the linear and branched isomers of these compounds. Most PFAS's are produced by two different processes. One process gives rise to linear PFAS's only while the other process produces both linear and branched isomers. Thus, both branched and linear PFAS's can potentially be found in the environment. For the aforementioned compounds that give rise to more than one peak, all the chromatographic peaks observed in the standard must be integrated and the areas totaled. Chromatographic peaks in a sample must be integrated in the same way as the CAL standard.

10.7.5 Prepare a set of CAL standards as outlined in table 5. The lowest concentration CAL standard must be at or below the LOQ.

10.7.6 The LC/MS/MS system is calibrated using the isotope dilution technique. Target analytes are quantitated against their isotopically labeled analog (Extracted Internal Standard) where commercially available. If a labeled analog is not

commercially available, the extracted internal standard with the closest retention time and /or closest chemical similarity is to be used. Use the LC/MS/MS data system software to generate a linear regression or quadratic calibration curve for each of the analytes. This curve must always be forced through zero and may be concentration weighted, if necessary. Forcing zero allows for a better estimate of the background levels of method analytes. A minimum of 5 levels are required for a linear calibration model and a minimum of 6 levels are required for a quadratic calibration model.

10.7.7 CALIBRATION ACCEPTANCE CRITERIA – A linear fit is acceptable if the calculated RSD or RSE for each target analyte is ≤20%. If linear or Quadratic regressions are used, coefficient of determination (r^2) values must be greater than 0.99. When quantitated using the initial calibration curve, each calibration point at or above the LOQ for each analyte must calculate to be within 70-130% of its true value. The calculate value of each EIS analyte must be within 50-150% of its true value. If these criteria cannot be met, corrective action is taken to reanalyze the CAL standards, restrict the range of calibration.

10.7.8 Bile salts interference check - The laboratory must analyze a TDCA standard after the initial calibration, prior to the analysis of tissue samples, to check for interferences caused by bile salts. If an interference is present, the chromatographic conditions must be modified to eliminate the interference from TDCA (e.g., changing the retention time of TDCA such that it falls outside the retention window for PFOS by at least one minute), and the initial calibration repeated.

10.8 CONTINUING CALIBRATION CHECK (CCV) – Minimum daily calibration verification is as follows. Verify the initial calibration at the beginning and end of each group of analyses, and after every tenth sample during analyses. In this context, a "sample" is considered to be a Field Sample. MBs, CCVs, LCSs, MSs, FDs FRBs and MSDs are not counted as samples. The beginning CCV of each analysis batch must be at or below the RL in order to verify instrument sensitivity prior to any analyses. If standards have been prepared such that all low CAL points are not in the same CAL solution, it may be necessary to analyze two CAL standards to meet this requirement. Alternatively, the analyte concentrations in the analyte PDS may be customized to meet these criteria. Subsequent CCVs should alternate between a medium and Low concentration CAL standard.

10.8.1 Inject an aliquot of the appropriate concentration CAL standard and analyze with the same conditions used during the initial calibration.

10.8.2 Calculate the concentration of each analyte and EIS in the CCV. The calculated amount for each native and EIS analyte for medium level CCVs must be within ± 30% of the true. If these conditions do not exist, then all data for the problem analyte must be considered invalid, and remedial action should be taken which may require recalibration. Any Field or QC Samples that have been analyzed since the last acceptable calibration verification should be reanalyzed after adequate calibration has been restored, with the following exception. If the CCV fails because the calculated concentration is greater than 130% for a particular method analyte, and Field Sample extracts show no detection for that method analyte, non-detects may be reported without re-analysis.

10.8.3 REMEDIAL ACTION – Failure to meet CCV QC performance criteria may require remedial action. Major maintenance, such as cleaning the electrospray probe, atmospheric pressure ionization source, cleaning the mass analyzer, replacing the LC column, etc., requires recalibration and verification of sensitivity by analyzing a CCV at or below the LOQ.

10.9 EXTRACT ANALYSIS

10.9.1 The same operating conditions used for the initial calibration and summarized in Tables 6 and 7 are to be used.

10.9.2 Prior to analysis of sample extracts, the Instrument mass calibration verification must be performed using standards whose mass range brackets the masses of interest and performed in the negative ion mode. The mass calibration is verified if the calculated mass is within ± .2 daltons of the specified mass.

10.9.3 Establish an appropriate retention time window for each analyte. This should be based on measurements of actual retention time variation for each method analyte in CAL standard solutions analyzed on the LC over the course of time. A value of plus or minus three times the standard deviation of the retention time obtained for each method analyte while establishing the initial calibration can be used to calculate a suggested window size. However, the experience of the analyst should weigh heavily on the determination of the appropriate retention window size.

10.9.4 Calibrate the system by either the analysis of a calibration curve or by confirming the initial calibration is still valid by analyzing a CCV.

10.9.5 Begin analyzing Field Samples, including QC samples, at their appropriate frequency by injecting the same size aliquots under the same conditions used to analyze the CAL standards.

10.9.6 For concentrations at or above the method LOQ, the total (branched and linear isomer) quantification ion response to the total (branched and linear isomer) confirmation ion response ratio must fall within ± 50% of the ratio observed in the midpoint initial calibration standard.

10.9.7 At the conclusion of data acquisition, use the same software that was used in the calibration procedure to identify peaks of interest in predetermined retention time windows. Use the data system software to examine the ion abundances of the peaks in the chromatogram. Identify an analyte by comparison of its retention time with that of the corresponding method analyte peak in a reference standard.

10.9.8 The analyst must not extrapolate beyond the established calibration range. If an analyte peak area exceeds the range of the initial calibration curve, the sample should be re-extracted with a reduced sample volume in order to bring the out of range target analytes into the calibration range. If a smaller sample size would not be representative of the entire sample, the following options are recommended. Re-extract an additional aliquot of sufficient size to ensure that it is representative of the entire sample. Spike it with a higher concentration of internal standard. Prior to LC/MS analysis, dilute the sample so that it has a concentration of internal standard equivalent to that present in the calibration standard. Then, analyze the diluted extract.3

10.9.9 In instances where re-extraction is not an option, dilute a subsample of the sample extract with 0.1% acetic acid by a factor no greater than 10x adjust the amount of the NIS in the diluted extract, and analyze the diluted extract. If the

responses for each EIS in the diluted extract meet the S/N and retention time, and the EIS recoveries from the analysis of the diluted extract are greater than 5%, then the compounds associated with those EISs may be quantified using isotope dilution. Use the EIS recoveries from the original analysis to select the dilution factor, with the objective of keeping the EIS recoveries in the dilution above that 5% lower limit. If the adjusted EIS recoveries are below 5%, the dilution is assumed invalid. If the adjusted EIS recoveries are greater than 5%, adjust the compound concentrations, detection limits, and minimum levels to account for the dilution.

11. Data Evaluation, Calculations and Reporting

11.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations using MS/MS. In validating this method, concentrations were calculated by measuring the product ions listed in Table 9.

11.2 Calculate analyte concentrations using the multipoint calibration established in Section 10.9. Do not use daily calibration verification data to quantitate analytes in samples. Adjust final analyte concentrations to reflect the actual sample volume determined in Section 10.8

C_{ex} = (Area of target analyte * Concentration of Labeled analog) / (area of labeled analog * CF)

C_s = (C_{ex} / sample volume in ml) * 1000

C_{ex} = The concentration of the analyte in the extract
CF = calibration factor from calibration.

11.3 Prior to reporting the data, the chromatogram should be reviewed for any incorrect peak identification or poor integration.

11.4 PFHxS, PFOS, PFOA, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 7 due to the linear and branch isomers of these compounds (Sect. 10.10.4.). The areas of all the linear and branched isomer peaks observed in the CAL standards for each of these analytes must be summed and the concentrations reported as a total for each of these analytes.

11.5 Calculations must utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty), typically two, and not more than three significant figures.

12. Contingencies for Handling Out-of-Control Data or Unacceptable Data

12.1 Section 9.0 outlines sample batch QC acceptance criteria. If non-compliant organic compound results are to be reported, the Organic Section Head and/or the Laboratory Director, and the Operations Manager must approve the reporting of these results. The laboratory Project Manager shall be notified and may choose to relay the non-compliance to the client, for approval, or other corrective action, such as re-sampling and re-analysis. The analyst, Data Reviewer, or Department Supervisor performing the secondary review initiates the project narrative, and the narrative must clearly document the non-compliance and provide a reason for acceptance of these results.

12.2 All results for the organic compounds of interest are reportable without qualification if extraction and analytical holding times are met, preservation requirements (including cooler temperatures) are met, all QC criteria are met, and matrix interference is not suspected during extraction or analysis of the samples. If any of the below QC parameters are not met, all associated samples must be evaluated for re-extraction and/or re-analysis.

13. Method Performance

13.1 Detection Limit Study (DL) / Limit of Detection Study (LOD) / Limit of Quantitation (LOQ)

13.1.1 The laboratory follows the procedure to determine the DL, LOD, and/or LOQ as outlined in Alpha SOP ID 1732. These studies performed by the laboratory are maintained on file for review.

13.2 Demonstration of Capability Studies

13.2.1 Refer to Alpha SOP ID 1739 for further information regarding IDC/DOC Generation.

13.2.2 The analyst must make a continuing, annual, demonstration of the ability to generate acceptable accuracy and precision with this method.

14. Pollution Prevention and Waste Management

14.1 Refer to Alpha's Chemical Hygiene Plan and Hazardous Waste Management and Disposal SOP for further pollution prevention and waste management information.

14.2 This method utilizes SPE to extract analytes from water. It requires the use of very small volumes of organic solvent and very small quantities of pure analytes, thereby minimizing the potential hazards to both the analyst and the environment as compared to the use of large volumes of organic solvents in conventional liquid-liquid extractions.

14.3 The analytical procedures described in this method generate relatively small amounts of waste since only small amounts of reagents and solvents are used. The matrices of concern are finished drinking water or source water. However, laboratory waste management practices must be conducted consistent with all applicable rules and regulations, and that laboratories protect the air, water, and land by minimizing and controlling all releases from fume hoods and bench operations. Also, compliance is required with any sewage discharge permits and regulations, particularly the hazardous waste identification rules and land disposal restrictions.

15. Referenced Documents

Chemical Hygiene Plan – ID 2124

SOP ID 1732 Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ) SOP

SOP ID 1739 Demonstration of Capability (DOC) Generation SOP

SOP ID 1728 Hazardous Waste Management and Disposal SOP

16. Attachments

Table 1: Names, Abbreviations, and CAS Registry Numbers for Target PFAS, Extracted Internal Standards and Non-extracted Internal Standards

Parameter	Acronym	CAS
PER- and POLYFLUOROALKYLETHER CARBOXYLIC ACIDS (PFECAs)		
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid	HFPO-DA	13252-13-6
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
PERFLUOROALKYLCARBOXILIC ACIDS (PFCAs)		

Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorononanoic acid	PFNA	375-95-1
Perfluorodecanoic acid	PFDA	335-76-2
Perfluoroundecanoic acid	PFUnA	2058-94-8
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluorotetradecanoic acid	PFTeDA	376-06-7
PERFLUOROALKYL SULFONIC ACIDS (PFASs)		
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluorononanesulfonic acid	PFNS	68259-12-1

Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5
CHLORO-PERFLUOROALKYLSULFONATE		
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
FLUOROTELOMER CARBOXYLIC ACIDS		
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3
Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4
PERFLUOROOCTANESULFONAMIDES		
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methylperfluoro-1-octanesulfonamide	NMeFOSA	31506-32-8
N-ethylperfluoro-1-octanesulfonamide	NEtFOSA	4151-50-2
PERFLUOROCTANE SULFONAMIDE ETHANOLS		
N-Methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2
TELOMER SULFONIC ACIDS		

1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2)	4:2FTS	757124-72-4
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2)	6:2FTS	27619-97-2
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2)	8:2FTS	39108-34-4
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
PERFLUOROETHER AND POLYETHER CARBOXYLIC ACIDS		
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6

Table 2: Stock and Nominal Extracted Internal Standard Concentrations

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M4PFBA	2000	40
M5PFPeA	1000	20
M5PFHxA	500	10
M4PFHpA	500	10
M8PFOA	500	10
M9PFNA	250	5
M6PFDA	250	5
M7PFUdA	250	5
MPFDoA	250	5
M2PFTeDA	250	5
M3PFBS	466	9.32
M3PFHxS	474	9.48
M8PFOS	479	9.58
M2-4:2FTS	938	18.8

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M2-6:2FTS	951	19
M2-8:2FTS	960	19.2
M8FOSA	500	10
d3-N-MeFOSA	500	10
d5-N-EtFOSA	500	10
d3-N-MeFOSAA	1000	20
d5-N-EtFOSAA	1000	20
d7-N-MeFOSE	5000	100
d9-N-EtFOSE	5000	100
M3HFPO-DA	2000	40

Table 3: Stock and Nominal Non-Extracted Internal Standard Concentrations

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M3PFBA	1000	40
M2PFHxA	500	10
M4PFOA	500	10
M5PFNA	250	5
M2PFDA	250	5
18O2PFHxS	474	9.48
M4PFOS	479	9.58

Table 4: Initial Calibration levels and Concentrations

Analyte	Cal A	Cal B (LOQ)	CAL C	Cal D	Cal E (CCV)	Cal F	Cal G	Cal H	Cal I
PFBA	.4	.8	2	5	10	20	50	250	500
PFPeA	.2	.4	1	2.5	5	10	25	125	250
PFHxA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFHpA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFOA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFNA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFDA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFUnA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFDoA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFTrDA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFTA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFBS	0.089	0.177	0.444	1.11	2.22	4.44	11.1	55.4	111
PFPeS	0.094	0.188	0.471	1.18	2.35	4.71	11.8	58.8	118

PFHxS	0.091	0.183	0.457	1.14	2.29	4.57	11.4	57.1	114
PFHpS	0.095	0.191	0.477	1.19	2.38	4.77	11.9	59.6	119
PFOS	0.093	0.186	0.464	1.16	2.32	4.64	11.6	58	116
PFNS	0.096	0.192	0.481	1.20	2.41	4.81	12	60.1	120
PFDS	0.097	0.193	0.483	1.21	2.41	4.83	12.1	60.3	121
PFDOS	0.097	0.194	0.485	1.21	2.43	4.85	12.1	60.6	121.
4:2FTS	0.375	0.75	1.88	4.69	9.38	18.8	46.9	234	469
6:2FTS	0.38	0.76	1.9	4.75	9.5	19	47.5	238	475
8:2FTS	0.384	0.768	1.92	4.8	9.6	19.2	48	240	480
PFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NEtFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSAA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NEtFOSAA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSE	1	2	5	12.5	25	50	125	625	1250
NEtFOSE	1	2	5	12.5	25	50	125	625	1250
HFPO-DA	.4	.8	2	5	10	20	50	250	500
ADONA	0.378	0.756	1.89	4.73	9.45	18.9	47.3	236	473
9Cl-PFONS	0.374	0.748	1.87	4.68	9.35	18.7	46.8	234	468
11Cl-PFOUdS	0.378	0.756	1.89	4.73	9.45	18.9	47.3	236	473
PFMPA	.2	.4	1	2.5	5	10	25	125	250
PFMBA	.2	.4	1	2.5	5	10	25	125	250
PFEESA	0.178	0.356	0.89	2.23	4.45	8.9	22.3	111	223
NFDHA	.2	.4	1	2.5	5	10	25	125	250
3:3FTCA	.5	1	2.5	6.25	12.5	25	62.5	312	624
5:3FTCA	2.5	5	12.5	31.3	62.5	125	312	1560	3120
7:3FTCA	2.5	5	12.5	31.3	62.5	125	312	1560	3125
M4PFBA	10	10	10	10	10	10	10	10	10
M5PFPeA	5	5	5	5	5	5	5	5	5
M5PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M4PFHpA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M8PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M9PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M6PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M7PFUdA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
MPFDoA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

M2PFTeDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M3PFBS	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
M3PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
M8PFOS	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
M2-4:2FTS	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69
M2-6:2FTS	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
M2-8:2FTS	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
M8FOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d3-N-MeFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d5-N-EtFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d3-N-MeFOSAA	5	5	5	5	5	5	5	5	5
d5-N-EtFOSAA	5	5	5	5	5	5	5	5	5
d7-N-MeFOSE	25	25	25	25	25	25	25	25	25
d9-N-EtFOSE	25	25	25	25	25	25	25	25	25
M3HFPO-DA	10	10	10	10	10	10	10	10	10
M3PFBA	5	5	5	5	5	5	5	5	5
M2PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M4PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M5PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M2PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
18O2PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
M4PFOS	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4

Table 5: Expected Mass Transitions and instrument conditions.

Q1	Q2	Analyte	DP Volts	CE Volts
213.032	169.022	PFBA	-50	-14
263.039	219.03	PFPeA	-55	-12
263.039	68.9	PFPeA_2	-55	-55
313.047	269.037	PFHxA	-45	-12
313.047	119	PFHxA_2	-45	-28
363.055	319.045	PFHpA	-60	-12
363.055	169.022	PFHpA_2	-60	-24
413.063	369.053	PFOA	-65	-14
413.063	169.022	PFOA_2	-65	-23
463.071	419.061	PFNA	-70	-14
463.071	219.03	PFNA_2	-70	-24

513.078	469.069	PFDA	-80	-16
513.078	219.03	PFDA_2	-80	-30
563.086	519.076	PFUnA	-85	-18
563.086	269.037	PFUnA_2	-85	-25
613.094	569.084	PFDoA	-85	-18
613.094	319.045	PFDoA_2	-85	-28
663.102	619.092	PFTrDA	-85	-20
663.102	169.022	PFTrDA_2	-85	-36
713.11	669.1	PFTA	-70	-22
713.11	169.022	PFTA_2	-70	-38
299.092	80.062	PFBS	-100	-65
299.092	99.061	PFBS_2	-100	-40
349.1	80.062	PFPeS	-100	-75
349.1	99.061	PFPeS_2	-100	-60
399.107	80.062	PFHxS	-120	-75
399.107	99.061	PFHxS_2	-120	-80
449.115	80.062	PFHpS	-140	-95
449.115	99.061	PFHpS_2	-140	-80
499.113	80.062	PFOS	-145	-108
499.113	99.061	PFOS_2	-145	-85
549.131	80.062	PFNS	-180	-100
549.131	99.061	PFNS_2	-180	-100
599.139	80.062	PFDS	-170	-110
599.138	99.061	PFDS_2	-170	-100
699.154	80.062	PFDoS	-160	-150
699.154	99.061	PFDoS_2	-160	-130
327.146	307.139	4:2FTS	-100	-28
327.146	81.07	4:2FTS_2	-100	-50
427.161	407.155	6:2FTS	-120	-33
427.161	81.07	6:2FTS_2	-120	-65
527.177	507.17	8:2FTS	-140	-39
527.177	81.07	8:2FTS_2	-140	-85
498.146	78.07	FOSA	-150	-90
498.146	478	FOSA_2	-150	-35
512.163	219.03	NMeFOSA	-130	-35
512.163	169.022	NMeFOSA_2	-130	-40
526.192	219.03	NEtFOSA	-140	-35
526.192	169.022	NEtFOSA_2	-140	-35
570.202	419.061	NMeFOSAA	-100	-28

570.202	483	NMeFOSAA_2	-100	-22
584.229	419.061	NEtFOSAA	-100	-28
584.229	526.192	NEtFOSAA_2	-100	-38
616.1	58.9	NMeFOSE	-90	-70
630	58.9	NEtFOSE	-80	-75
285.035	169.022	HFPO-DA	-60	-12
285.035	184.9	HFPO-DA_2	-60	-18
377.06	251.028	ADONA	-65	-18
377.06	84.8	ADONA_2	-65	-48
530.8	351.05	9Cl-PFONS	-130	-38
532.8	353	9Cl-PFONS_2	-130	-38
630.9	451.031	11Cl-PFOUdS	-145	-41
632.9	452.9	11Cl-PFOUdS_2	-145	-41
241.085	177.069	3:3FTCA	-60	-12
241.085	117	3:3FTCA_2	-60	-50
341.101	237.072	5:3FTCA	-70	-20
341.101	217	5:3FTCA_2	-70	-35
441.117	316.9	7:3FTCA	-85	-30
441.117	337.088	7:3FTCA_2	-85	-20
315.093	135.013	PFEESA	-100	-35
315.093	82.9	PFEESA_2	-100	-25
229.032	85.006	PFMPA	-40	-25
279.042	85.006	PFMBA	-45	-25
295.032	201	NFDHA	-30	-15
295.032	84.9	NFDHA_2	-30	-40
217.001	171.999	MPFBA	-50	-14
268.001	222.999	M5PFPeA	-55	-12
318.009	273.007	M5PFHxA	-45	-12
367.024	322.022	M4PFHpA	-60	-12
421.002	376	M8PFOA	-65	-14
472.002	427	M9PFNA	-70	-14
519.033	474.03	M6PFDA	-80	-16
570.033	525.031	M7-PFUdA	-85	-18
615.079	570.033	MPFDoA	-85	-18
715.094	670.092	M2PFTeDA	-70	-22
302.069	80.062	M3PFBS	-100	-65
402.084	80.062	M3PFHxS	-120	-74
507.062	80.062	M8PFOS	-145	-85
329.13	81.07	M2-4:2FTS	-100	-50

429.162	81.07	M2-6:2FTS	-120	-65
529.162	81.07	M2-8:2FTS	-140	-85
506.077	78.07	M8FOSA	-150	-90
515.183	219.03	d3-NMeFOSA	-130	-35
531.222	219.03	d5-NEtFOSA	-140	-35
573.22	419.061	d3-NMeFOSAA	-75	-28
589.259	419.061	d5-NEtFOSAA	-90	-28
623.2	58.9	d7-NMeFOSE	-100	-28
639.2	58.9	d9-NEtFOSE	-100	-28
287.02	169.022	M3HFPO-DA	-60	-12
216.009	171.999	M3PFBA	-50	-14
315.032	270.03	M2PFHxA	-45	-12
417.032	372.03	M4PFOA	-65	-14
468.032	423.03	M5PFNA	-70	-14
515.063	470.061	M2PFDA	-80	-16
403.107	84.062	18O2-PFHxS	-120	-74
503.093	80.062	M4PFOS	-145	-85

Table 6: LC Method Conditions

Time (min)	2 mM Ammonium Acetate (5:95 CH/H_2O)	100% Acetonitrile	Gradient Curve
Initial	100.0	0.0	0
.2	100.0	0.0	2
4	70	30	7
7	45	55	8
9	25	80	8
10	5	95	6
10.4	98	2	10
11.8	100	0	7
12	100	0	1
Waters Aquity UPLC ® BEHC_{18} 2.1 x 50 mm packed with 1.7 µm BEH C_{18} stationary phase Flow rate of 0.4 mL/min 2 µL injection			

Table 7: ESI-MS Method Conditions

ESI Conditions	
Polarity	Negative ion
Curtain Gas	30
Collision gas	9
Ion Spray Voltage	-4500
Desolvation gas temp.	500 °C
Ion Source Gas 1	30
Ion Source Gas 2	50
Entrance Poitential	-10
Exic Cell Potential	-11

Table 8. Reporting limits by Matrix

Compound	Aqueous (ng/L)	Solid (ng/g)	Tissue (ng/g)
PFBA	6.4	0.8	2
PFPeA	3.2	0.4	1
PFHxA	1.6	0.2	0.5
PFHpA	1.6	0.2	0.5
PFOA	1.6	0.2	0.5
PFNA	1.6	0.2	0.5
PFDA	1.6	0.2	0.5
PFUnA	1.6	0.2	0.5
PFDoA	1.6	0.2	0.5
PFTrDA	1.6	0.2	0.5
PFTA	1.6	0.2	0.5
PFBS	1.6	0.2	0.5
PFPeS	1.6	0.2	0.5
PFHxS	1.6	0.2	0.5
PFHpS	1.6	0.2	0.5
PFOS	1.6	0.2	0.5
PFNS	1.6	0.2	0.5
PFDS	1.6	0.2	0.5
PFDoS	1.6	0.2	0.5
4:2FTS	6.4	0.8	2
6:2FTS	6.4	0.8	2
8:2FTS	6.4	0.8	2
FOSA	1.6	0.2	2
NMeFOSA	1.6	0.2	0.5

NEtFOSA	1.6	0.2	0.5
NMeFOSAA	1.6	0.2	0.5
NEtFOSAA	1.6	0.2	0.5
NMeFOSE	16	2	5
NEtFOSE	16	2	5
HFPO-DA	6.4	0.8	2
ADONA	6.4	0.8	2
9Cl-PFONS	6.4	0.8	2
11Cl-PFOUdS	6.4	0.8	2
3:3FTCA	8	1	2.5
5:3FTCA	40	5	12.5
7:3FTCA	40	5	12.5
PFEESA	3.2	0.4	1
PFMPA	3.2	0.4	1
PFMBA	3.2	0.4	1
NFDHA	3.2	0.4	1

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for sample handling which will allow consistent and accurate results. Valid chemistry data are integral to investigations that characterize media-quality conditions. Thus, this SOP is designed to ensure that once samples are collected, they are preserved, packed and delivered in a manner which will maintain sample integrity to as great an extent as possible. The procedures outlined are applicable to most sampling events and any required modifications must be clearly described in the work plan.

2.0 CONSIDERATIONS

Sample containers, sampling equipment decontamination, quality assurance/quality control (QA/QC), sample preservation, and sample handling are all components of this SOP.

2.1 Sample Containers

Prior to collection of a sample, considerations must be given to the type of container that will be used to store and transport the sample. The type and number of containers selected is usually based on factors such as sample matrix, potential contaminants to be encountered, analytical methods requested, and the laboratory's internal quality assurance requirements. In most cases, the overriding considerations will be the analytical methodology, or the state or federal regulatory requirements because these regulations generally encompass the other factors. The sample container selected is usually based on some combination of the following criteria:

a. Reactivity of Container Material with Sample

Choosing the proper composition of sample containers will help to ensure that the chemical and physical integrity of the sample is maintained. For sampling potentially hazardous material, glass is the recommended container type because it is chemically inert to most substances. Plastic containers are not recommended for most hazardous wastes because the potential exists for contaminants to adsorb to the surface of the plastic or for the plasticizer to leach into the sample.

In some instances, however, the sample characteristics or analytes of interest may dictate that plastic containers be used instead of glass. Because some metals species will adhere to the sides of the glass containers in an aqueous matrix, plastic bottles (e.g., nalgene) must be used for samples collected for metals analysis. A separate, plastic

container should accompany glass containers if metals analysis is to be performed along with other analyses. Likewise, other sample characteristics may dictate that glass cannot be used. For example, in the case of a strong alkali waste or hydrofluoric solution, plastic containers may be more suitable because glass containers may be etched by these compounds and create adsorptive sites on the container's surface.

b. Volume of the Container

The volume of sample to be collected will be dictated by the analysis being performed and the sample matrix. The laboratory must supply bottles of sufficient volume to perform the required analysis. In most cases, the methodology dictates the volume of sample material required to complete the analysis. However, individual laboratories may provide larger volume containers for various analytes to ensure sufficient quantities for duplicates or other QC checks.

To facilitate transfer of the sample from the sampler into the container and to minimize spillage and sample disturbance, wide-mouth containers are recommended. Aqueous volatile organic samples must be placed into 40-milliliter (ml) glass vials with polytetrafluoroethylene (PTFE) (e.g., TeflonTM) septums. Non-aqueous volatile organic samples should be collected in the same type of vials or in 4-ounce (oz) wide-mouth jars provided by the laboratory. These jars should have PTFE-lined screw caps.

c. Color of Container

Whenever possible, amber glass containers should be used to prevent photodegradation of the sample, except when samples are being collected for metals analysis. If amber containers are not available, then containers holding samples should be protected from light (i.e., place in cooler with ice immediately after filling).

d. Container Closures

Container closures must screw on and off the containers and form a leak-proof seal. Container caps must not be removed until the container is ready to be filled with the sample, and the container cap must be replaced (securely) immediately after filling it. Closures should be constructed of a material which is inert with respect to the sampled material, such as PTFE (e.g., TeflonTM). Alternately, the closure may be separated from the sample by a closure liner that is inert to the sample material such as PTFE sheeting. If soil or sediment samples are being collected, the threads of the container must be wiped clean with a dedicated paper towel or cloth, so the cap can be threaded properly.

e. Decontamination of Sample Containers

Sample containers must be laboratory cleaned by the laboratory performing the analysis. The cleaning procedure is dictated by the specific analysis to be performed on the sample. Sample containers must be carefully examined to ensure that all containers appear clean. Do not mistake the preservative as unwanted residue. The bottles should not be field cleaned. If there is any question regarding the integrity of the bottle, then the laboratory must be contacted immediately and the bottle(s) replaced.

f. Sample Bottle Storage and Transport

No matter where the sample bottles are, whether at the laboratory waiting to be packed for shipment or in the field waiting to be filled with sample, care must be taken to avoid contamination. Sample shuttles or coolers, and sample bottles must be stored and transported in clean environments. Sample bottles and clean sampling equipment must never be stored near solvents, gasoline, or other equipment that is a potential source of cross-contamination. When under chain of custody, sample bottles must be secured in locked vehicles, and custody sealed in shuttles or in the presence of authorized personnel. Information which documents that proper storage and transport procedures have been followed must be included in the field notebook and on appropriate field forms.

2.2 Decontamination of Sampling Equipment

Proper decontamination of all re-usable sampling equipment is critical for all sampling episodes. The SOP for Decontamination of Field Equipment and SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for decontamination of various types of equipment.

2.3 Quality Assurance/Quality Control Samples

QA/QC samples are intended to provide control over the proper collection and tracking of environmental measurements, and subsequent review, interpretation and validation of generated analytical data. The SOPs for Collection of Quality Control Samples, for Evaluation and Validation of Data, and for Field Record Keeping and Quality Assurance/Quality Control must be referred to for detailed guidance regarding these respective procedures. SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for QA/QC procedures.

2.4 Sample Preservation Requirements

Certain analytical methodologies for specific analytes require chemical additives in order to stabilize and maintain sample integrity. Generally, this is accomplished under the following two scenarios:

a. Sample bottles are preserved at the laboratory prior to shipment into the field.

b. Preservatives are added in the field immediately after the samples are collected.

Many laboratories provide pre-preserved bottles as a matter of convenience and to help ensure that samples will be preserved immediately upon collection. A problem associated with this method arises if not enough sample could be collected, resulting in too much preservative in the sample. More commonly encountered problems with this method include the possibility of insufficient preservative provided to achieve the desired pH level or the need for additional preservation due to chemical reactions caused by the addition of sample liquids to pre-preserved bottles. The use of pre-preserved bottles is acceptable; however, field sampling teams must always be prepared to add additional preservatives to samples if the aforementioned situations occur. Furthermore, care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling and therefore diluting the preservative (i.e., not having enough preservative for the volume of sample).

When samples are preserved after collection, special care must be taken. The transportation and handling of concentrated acids in the field requires additional preparation and adherence to appropriate preservation procedures. All preservation acids used in the field should be trace-metal or higher-grade.

2.5 Sample Handling

After the proper sample bottles have been received under chain-of-custody, properly decontaminated equipment has been used to collect the sample, and appropriate preservatives have been added to maintain sample integrity, the final step for the field personnel is checking the sample bottles prior to proper packing and delivery of the samples to the laboratory.

All samples should be organized and the labels checked for accuracy. The caps should be checked for tightness and any 40-ml volatile organic compound (VOC) bottles must be checked for bubbles. Each sample bottle must be placed in an individual Ziploc® bag to protect the label, and placed on ice. The bottles must be carefully packed to prevent breakage during transport. When several bottles have been collected for an individual sample, they should not be placed adjacent to each other in the cooler to prevent possible breakage of all bottles for a given sample. If there are any samples which are known or suspected to be highly

contaminated, these should be placed in an individual cooler under separate chain-of-custody to prevent possible cross contamination. Sufficient ice (wet or blue packs) should be placed in the cooler to maintain the temperature at 4 degrees Celsius (°C) until delivery at the laboratory. Consult the work plan to determine if a particular ice is specified as the preservation for transportation (e.g., the United States Environmental Protection Agency does not like the use of blue packs because they claim that the samples will not hold at 4°C). If additional coolers are required, then they should be purchased. The chain-of-custody form should be properly completed, placed in a "zip-lock" bag, and placed in the cooler. One copy must be maintained for the project files. The cooler should be sealed with packing tape and a custody seal. The custody seal number should be noted in the field book. Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time. If overnight mail is utilized, then the shipping bill must be maintained for the files and the laboratory must be called the following day to confirm receipt.

3.0 EQUIPMENT AND MATERIALS

3.1 General equipment and materials may include, but not necessarily be limited to, the following:

a. Sample bottles of proper size and type with labels.

b. Cooler with ice (wet or blue pack).

c. Field notebook, appropriate field form(s), chain-of-custody form(s), custody seals.

d. Black pen and indelible marker.

e. Packing tape, "bubble wrap," and "zip-lock" bags.

f. Overnight (express) mail forms and laboratory address.

g. Health and safety plan (HASP).

h. Work plan/scope of work.

i. Pertinent SOPs for specified tasks and their respective equipment and materials.

3.2 Preservatives for specific samples/analytes as specified by the laboratory. Preservatives must be stored in secure, spillproof glass containers with their content, concentration, and date of preparation and expiration clearly labeled.

3.3 Miscellaneous equipment and materials including, but not necessarily limited to, the following:

a. Graduated pipettes.

b. Pipette bulbs.

c. Litmus paper.

d. Glass stirring rods.

e. Protective goggles.

f. Disposable gloves.

g. Lab apron.

h. First aid kit.

i. Portable eye wash station.

j. Water supply for immediate flushing of spillage, if appropriate.

k. Shovel and container for immediate containerization of spillage-impacted soils, if appropriate.

4.0 PROCEDURE

4.1 Examine all bottles and verify that they are clean and of the proper type, number, and volume for the sampling to be conducted.

4.2 Label bottles carefully and clearly with project name and number, site location, sample identification, date, time, and the sampler's initials using an indelible marker.

4.3 Collect samples in the proper manner (refer to specific sampling SOPs).

4.4 Conduct preservation activities as required after each sample has been collected. Field preservation must be done immediately and must not be done later than 30 minutes after sample collection.

4.5 Conduct QC sampling, as required.

4.6 Seal each container carefully and place in an individual "zip lock" bag.

4.7 Organize and carefully pack all samples in the cooler immediately after collection (e.g., bubble wrap). Insulate samples so that breakage will not occur.

4.8 Complete and place the chain-of-custody form in the cooler after all samples have been collected. Maintain one copy for the project file. If the cooler is to be transferred several times prior to shipment or delivery to the laboratory, it may be easier to tape the chain-of-custody to the exterior of the sealed cooler. When exceptionally hazardous samples are known or suspected to be present, this should be identified on the chain-of-custody as a courtesy to the laboratory personnel.

4.9 Add additional ice as necessary to ensure that it will last until receipt by the laboratory.

4.10 Seal the cooler with packing tape and a custody seal. Record the number of the custody seal in the field notebook and on the field form. If there are any exceptionally hazardous samples, then shipping regulations should be examined to ensure the sample containers and coolers are in compliance and properly labeled.

4.11 Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time.

4.12 Maintain the shipping bill for the project files if overnight mail is utilized and call the laboratory the following day to confirm receipt.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for decontamination of all field equipment potentially exposed to contamination during drilling, and soil and water sampling. The objective of decontamination is to ensure that all drilling, and soil-sampling and water-sampling equipment is decontaminated (free of potential contaminants): 1) prior to being brought onsite to avoid the introduction of potential contaminants to the site; 2) between drilling and sampling events/activities onsite to eliminate the potential for cross-contamination between boreholes and/or wells; and 3) prior to the removal of equipment from the site to prevent the transportation of potentially contaminated equipment offsite.

In considering decontamination procedures, state and federal regulatory agency requirements must be considered because of potential variability between state and federal requirements and because of variability in the requirements of individual states. Decontamination procedures must be in compliance with state and/or federal protocols in order that regulatory agency(ies) scrutiny of the procedures and data collected do not result in non-acceptance (invalidation) of the work undertaken and data collected.

2.0 PROCEDURE FOR DRILLING EQUIPMENT

The following is a minimum decontamination procedure for drilling equipment. Drilling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

2.1 The rig and all associated equipment should be properly decontaminated by the contractor before arriving at the test site.

2.2 The augers, drilling casings, rods, samplers, tools, rig, and any piece of equipment that can come in contact (directly or indirectly) with the soil, will be steam cleaned onsite prior to set up for drilling to ensure proper decontamination.

2.3 The same steam cleaning procedures will be followed between boreholes (at a fixed on-site location[s], if appropriate) and before leaving the site at the end of the study.

2.4 All on-site steam cleaning (decontamination) activities will be monitored and documented by a member(s) of the staff of Roux Associates, Inc.

2.5 If drilling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat drilling equipment, then special decontamination procedures may have to be utilized before steam cleaning (e.g., hexane scrub and wash).

2.6 Containment of decontamination fluids may be necessary (e.g., rinseate from steam cleaning) or will be required (e.g., hexane), and disposal must be in accordance with state and/or federal procedures.

3.0 PROCEDURE FOR SOIL-SAMPLING EQUIPMENT

The following is a minimum decontamination procedure for soil-sampling equipment (e.g., split spoons, stainless-steel spatulas). Soil-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

3.1 Wear disposable gloves while cleaning equipment to avoid cross-contamination and change gloves as needed.

3.2 Steam clean the sampler or rinse with potable water. If soil-sampling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat sampling equipment, then special decontamination procedures may have to be utilized before steam cleaning and washing in detergent solution (e.g., hexane scrub and wash).

3.3 Prepare a non-phosphate, laboratory-grade detergent solution and distilled or potable water in a clean bucket.

3.4 Disassemble the sampler, as necessary and immerse all parts and other sampling equipment in the solution.

3.5 Scrub all equipment in the bucket with a brush to remove any adhering particles.

3.6 Rinse all equipment with copious amounts of potable water followed by distilled or deionized water.

3.7 Place clean equipment on a clean plastic sheet (e.g., polyethylene)

3.8 Reassemble the cleaned sampler, as necessary.

3.9 Transfer the sampler to the driller (or helper) making sure that this individual is also wearing clean gloves or wrap the equipment with a suitable material (e.g., plastic bag, aluminum foil.

As part of the decontamination procedure for soil-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

4.0 PROCEDURE FOR WATER-SAMPLING EQUIPMENT

The following is a decontamination procedure for water-sampling equipment (e.g., bailers, pumps). Water-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

4.1 Decontamination procedures for bailers follow:

a. Wear disposable gloves while cleaning bailer to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a bucket.

c. Disassemble bailer (if applicable) and discard cord in an appropriate manner and scrub each part of the bailer with a brush and solution.

d. Rinse with potable water and reassemble bailer.

e. Rinse with copious amounts of distilled or deionized water.

f. Air dry.

g. Wrap equipment with a suitable material (e.g., clean plastic bag, aluminum foil).

h. Rinse bailer at least three times with distilled or deionized water before use.

4.2 Decontamination procedures for pumps follow:

a. Wear disposable gloves while cleaning pump to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a clean bucket, clean garbage can, or clean 55-gallon drum.

c. Flush the pump and discharge hose (if not disposable) with the detergent solution and discard disposable tubing and/or cord in an appropriate manner.

d. Flush the pump and discharge hose (if not disposable) with potable water.

e. Place the pump on clear plastic sheeting.

f. Wipe any pump-related equipment (e.g., electrical lines, cables, discharge hose) that entered the well with a clean cloth and detergent solution, and rinse or wipe with a clean cloth and potable water.

g. Air dry.

h. Wrap equipment with a suitable material (e.g., clean plastic bag).

As part of the decontamination procedure for water-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

Date: May 5, 2000

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for the collection of soil samples for laboratory analysis. This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, grab samples from stockpiled soils, surface samples, test pit samples, etc.

2.0 CONSIDERATIONS

Soil samples may be collected in either a random or biased manner. Random samples can be based on a grid system or statistical methodology. Biased samples can be collected in areas of visible impact or suspected source areas. Soil samples can be collected at the surface, shallow subsurface, or at depth. When samples are collected at depth the water content should be noted, since generally "soil sampling" is restricted to the unsaturated zone. Equipment selection will be determined by the depth of the sample to be collected. A thorough description of the sampling locations and proposed methods of sample collection should be included in the work plan.

Commonly, surface sampling refers to the collection of samples at a 0 to 6-inch depth interval. Certain regulatory agencies may define the depth interval of a surface sample differently, and this must be defined in the work plan. Collection of surface soil samples is most efficiently accomplished with the use of a stainless-steel trowel or scoop. For samples at greater depths a decontaminated bucket auger or power auger may be needed to advance the hole to the point of sample collection. Another clean bucket auger should then be used to collect the sample. To collect samples at depths of greater than approximately six feet the use of a drill rig and split spoon samples will usually be necessary. In some situations, sample locations are accessed with the use of a backhoe.

3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines soil sampling requirements.

b. Field notebook, field form(s), maps, chain-of-custody forms, and custody seals.

c. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents, aluminum foil, plastic sheeting, etc.).

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable sampling gloves.

g. Laboratory-supplied sample containers with labels.

h. Cooler with blue or wet ice.

i. Plastic sheeting.

j. Black pen and indelible marker.

k. Zip-lock bags and packing material.

l. Tape measure.

m. Paper towels or clean rags.

n. Masking and packing tape.

o. Overnight (express) mail forms.

4.0 DECONTAMINATION

All reusable sampling equipment will be thoroughly cleaned according to the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and plastic sheeting will be changed after each use and discarded in an appropriate manner.

5.0 PROCEDURE

5.1 Prior to collecting soil samples, ensure that all sampling equipment has been thoroughly cleaned according to the decontamination SOP. If samples are to be collected at depth, then the boring must be advanced with thoroughly cleaned equipment to the desired sampling horizon and a different thoroughly cleaned sampler must be used to collect the sample.

5.2 Using disposable gloves and a pre-cleaned, stainless steel spatula or spoon, extract the soil sample from the sampler, measure the recovery, and separate the wash from the true sample. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

5.3 Place the sample in a laboratory-supplied, pre-cleaned sample container. This should be done as quickly as possible and this is especially important when sampling for volatile organic compounds (VOCs). Samples to be analyzed for VOCs must be collected prior to other constituents.

5.4 The sample container will be labeled with appropriate information such as, client name, site location, sample identification (location, depth, etc.), date and time of collection, and sampler's initials.

5.5 Using the remaining portion of soil from the sampler, log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, layering, grain size, etc.).

5.6 If soil samples are to be composited in the field, then equal portions from selected locations will be placed on a clean plastic sheet and homogenized. Alternately, several samples may be submitted to the laboratory for compositing by weight. The method used is dependent upon regulatory requirements. Specific compositing procedures shall be approved by the appropriate regulatory agency and described in the work plan. Samples to be analyzed for VOCs will not be composited unless required by a regulatory agency.

5.7 After the sample has been collected, labeled, and logged in detail, it is placed in a zip-lock bag and stored in a cooler at 4°C.

5.8 A chain-of-custody form is completed for all samples collected. One copy is retained and two are sent with the samples in a zip-lock bag to the laboratory. A custody seal is placed on the cooler prior to shipment.

5.9 Samples collected from Monday to Friday are to be delivered to the laboratory within 24 hours of collection. If Saturday delivery is unavailable, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if any analytes require a shorter delivery time.

5.10 The field notebook and appropriate forms should include, but not be limited to the following: client name, site location, sample location, sample depth, sample identification, date and time collected, sampler's name, method of sample collection, number and type of containers, geologic description of material, description of decontamination procedures, etc. A site map should be prepared with exact measurements to each sample location in case follow-up sampling is necessary.

5.11 All reusable sampling equipment must be thoroughly cleaned in accordance with the decontamination SOP. Following the final decontamination (after all samples are collected) the sampling equipment is wrapped in aluminum foil. Discard any gloves, foil, plastic, etc. in an appropriate manner that is consistent with site conditions.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for the sampling of ground-water monitoring wells for dissolved constituents. As part of the SOP for the sampling of ground-water monitoring wells, sample collection equipment and devices must be considered, and equipment decontamination and pre-sampling procedures (e.g., measuring water levels, sounding wells, and purging wells) must be implemented. Sampling objectives must be firmly established in the work plan before considering the above.

Valid water-chemistry data are integral to a hydrogeologic investigation that characterizes ground-water quality conditions. Water-quality data are used to evaluate both current and historic aquifer chemistry conditions, as well as to estimate future conditions (e.g., trends, migration pathways). Water-quality data can be used to construct ground-water quality maps to illustrate chemical conditions within the flow system, to generate water-quality plots to depict conditions with time and trends, and to perform statistical analyses to quantify data variability, trends, and cleanup levels.

2.0 EQUIPMENT AND MATERIALS

2.1 In order to sample ground water from monitoring wells, specific equipment and materials are required. The equipment and materials list may include, but not necessarily be limited to, the following:

a. Bailers (Teflon™ or stainless steel).

b. Pumps (centrifugal, peristaltic, bladder, electric submersible, bilge, hand-operated diaphragm, etc.).

c. Gas-displacement device(s).

d. Air-lift device(s).

e. Teflon™ tape, electrical tape.

f. Appropriate discharge hose.

g. Appropriate discharge tubing (e.g., polypropylene, teflon, etc.) if using a peristaltic pump.

h. Appropriate compressed gas if using bladder-type or gas-displacement device.

i. Portable generator and gasoline or alternate power supply if using an electric submersible pump.

j. Non-absorbent cord (e.g., polypropylene, etc.).

k. Plastic sheeting.

l. Tape measure (stainless steel, steel, fiberglass) with 0.01-foot measurement increments and chalk (blue carpenter's).

m. Electronic water-level indicators (e.g., m-scope, etc.) or electric water-level/product level indicators.

n. Non-phosphate, laboratory-grade detergent.

o. Distilled/Deionized water.

p. Potable water.

q. Paper towels, clean rags.

r. Roux Associates' field forms (e.g., daily log, well inspection checklist, sampling, etc.) and field notebook.

s. Well location and site map.

t. Well keys.

u. Stop watch, digital watch with second increments, or watch with a second hand.

v. Water Well Handbook.

w. Calculator.

x. Black pen and water-proof marker.

y. Tools (e.g., pipe wrenches, screwdrivers, hammer, pliers, flashlight, pen knife, etc.).

z. Appropriate health and safety equipment, as specified in the site health and safety plan (HASP).

aa. pH meter(s) and buffers.

bb. Conductivity meter(s) and standards.

cc. Thermometer(s).

dd. Extra batteries (meters, thermometers, flashlight).

ee. Filtration apparatus, filters, pre-filters.

ff. Plasticware (e.g., premeasured buckets, beakers, flasks, funnels).

gg. Disposable gloves.

hh. Water jugs.

ii. Laboratory-supplied sample containers with labels.

jj. Cooler(s).

kk. Ice (wet, blue packs).

ll. Masking, duct, and packing tape.

mm. Chain-of-custody form(s) and custody seal(s).

nn. Site sampling and analysis plan (SAP).

oo. Site health and safety plan (HASP).

pp. Packing material (e.g., bubble wrap)

qq. "Zip-lock" plastic bags.

rr. Overnight (express) mail forms.

3.0 DECONTAMINATION

3.1 Make sure all equipment is decontaminated and cleaned before use (refer to the SOP for Decontamination of Field Equipment for detailed decontamination methods, summaries for bailers and pumps are provided below). Use new, clean materials when decontamination is not appropriate (e.g., non-absorbent cord, disposable gloves). Document, and initial and date the decontamination procedures on the appropriate field form and in the field notebook.

a. Decontaminate a bailer by: 1) wearing disposable gloves, 2) disassembling (if appropriate) and scrubbing in a non-phosphate, laboratory-grade detergent and distilled/deionized water solution, and 3) rinsing first with potable water and then distilled/deionized water.

b. Decontaminate a pump by: 1) wearing disposable gloves, 2) flushing the pump and discharge hose (if not disposable) first with a non-phosphate, laboratory-grade detergent and potable water solution in an appropriate

container (clean bucket, garbage can, or 55-gallon drum) and then with distilled/deionized water or potable water, and 3) wiping pump-related equipment (e.g., electrical lines, cables, discharge hose) first with a clean cloth and detergent solution and then rinsing or wiping with a clean cloth and distilled/deionized water or potable water.

3.2 Note that the decontamination procedures for bailers and pumps are the minimum that must be performed. Check the work plan to determine if chemicals specified by individual state regulatory agencies must also be used for decontamination procedures (e.g., hexane, nitric acid, acetone, isopropanol, etc.).

4.0 CALIBRATION OF FIELD ANALYSIS EQUIPMENT

Calibrate field analysis equipment before use (e.g., thermometers, pH and conductivity meters, etc.). Refer to the specific SOP for field analysis for each respective piece of equipment. Document, and initial and date the calibration procedures on the appropriate field form, in the field notebook, and in the calibration log book.

5.0 PROCEDURE

5.1 Document, and initial and date well identification, pre-sampling information, and problems encountered on the appropriate field form and in the field notebook as needed.

5.2 Inspect the protective casing of the well and the well casing, and note any items of concern such as a missing lock, or bent or damaged casing(s).

5.3 Place plastic sheeting around the well to protect sampling equipment from potential cross contamination.

5.4 Remove the well cap or plug and, if necessary, clean the top of the well off with a clean rag. Place the cap or plug on the plastic sheeting. If the well is not vented, allow several minutes for the water level in the well to equilibrate. If fumes or gases are present, then diagnose these with the proper safety equipment. Never inhale the vapors.

5.5 Measure the depth to water (DTW) from the measuring point (MP) on the well using a steel tape and chalk or an electronic sounding device (m-scope). Refer to the specific SOPs for details regarding the use of a steel tape or a m-scope for measuring water levels. Calculate the water-level elevation. Document, and initial and date the information on the appropriate field form and in the field notebook.

5.6 Measuring the total depth of the well from the MP with a weighted steel tape. Calculate and record the volume of standing water in the well casing on the appropriate field form and in the field notebook.

5.7 Decontaminate the equipment used to measure the water level and sound the well with a non-phosphate, laboratory-grade detergent solution followed by a distilled/deionized water rinse.

5.8 Purge the well prior to sampling (refer to the SOP for Purging a Well). The well should be pumped or bailed to remove the volume of water specified in the work plan. Usually three to five casing volumes are removed if the recharge rate is adequate to accomplish this within a reasonable amount of time.

If the formation cannot produce enough water to sustain purging, then one of two options must be followed. These include: 1) pumping or bailing the well dry, or 2) pumping or bailing the well to "near-dry" conditions (i.e., leaving some water in the well). The option employed must be specified in the work plan and be in accordance with regulatory requirements.

If the well is purged dry, then all the standing water has been removed and upon recovery the well is ready for sampling. However, depending on the rate of recovery and the time needed to complete the sampling round, one of the following procedures may have to be implemented: 1) the well may have to be sampled over a period of more than one day; 2) the well may not yield enough water to collect a complete suite of samples and only select (most important) samples will be collected; or 3) the well may not recover which will preclude sampling. Regardless of the option that must be followed, the sampling procedure must be fully documented. When preparing to conduct a sampling round, review drilling, development, and previous sampling information (if available) to identify low-yielding wells in order to purge them first, and potentially allow time for the well to recover for sampling.

5.9 Record the physical appearance of the water (i.e. color, turbidity, odor, etc.) on the appropriate field form and in the field notebook, as it is purged. Note any changes that occur during purging.

5.10 If a bailer is used to collect the sample, then:

a. Flush the decontaminated bailer three times with distilled/deionized water.

b. Tie the non-absorbent cord (polypropylene) to the bailer with a secure knot and then tie the free end of the bailer cord to the protective casing or, if possible, some nearby structure to prevent losing the bailer and cord down the well.

c. Lower the bailer slowly down the well and into the water column to minimize disturbance of the water surface. If a bottom-filling bailer is used, then do not submerge the top of the bailer; however, if a top-filling bailer is used, then submerge the bailer several feet below the water surface.

d. Remove and properly discard one bailer volume from the well to rinse the bailer with well water before sampling. Again, lower the bailer slowly down the well to the appropriate depth depending on the bailer type (as discussed above in 5.11 c). When removing the bailer from the well, do not allow the bailer cord to rest on the ground but coil it on the protective plastic sheeting placed around the well. Certain regulatory agencies require that the first bailer volume collected be utilized for the samples.

5.11 If a pump is used to collect the sample, then use the same pump used to purge the well and, if need be, reduce the discharge rate to facilitate filling sample containers and to avoid problems that can occur while filling sample containers (as listed in Number 5.14, below). Alternately, the purge pump may be removed and a thoroughly decontaminated bailer can be used to collect the sample.

5.12 Remove each appropriate container's cap only when ready to fill each with the water sample, and then replace and secure the cap immediately.

5.13 Fill each appropriate, pre-labeled sample container carefully and cautiously to prevent: 1) agitating or creating turbulence; 2) breaking the container; 3) entry of, or contact with, any other medium; and 4) spilling/splashing the sample and exposing the sampling team to contaminated water. Immediately place the filled sample container in an ice-filled (wet ice or blue pack) cooler for storage. If wet ice is used it is recommended that it be repackaged in zip-lock bags to help keep the cooler dry and the sample labels secure. Check the work plan as to whether wet ice or blue packs are specified for cooling the samples because certain regulatory agencies may specify the use of one and not the other.

5.14 "Top-off" containers for volatile organic compounds (VOCs) and tightly seal with Teflon™-lined septums held in place by open-top screw caps to prevent volatilization. Ensure that there are no bubbles by turning the container upside down and tapping it gently.

5.15 Filter water samples (Procedure 4.6) collected for dissolved metals analysis prior to preservation to remove the suspended sediment from the sample. If water samples are to be collected for total metals analysis, then collect a second set of samples without field filtering.

In the event that the regulatory agency(ies) want unfiltered samples for metals analysis, a second set of filtered samples should also be collected. Because unfiltered samples are indications of total metals (dissolved and suspended) they are not representative of aquifer conditions because ground water does not transport sediment (except in some rare cases). Thus, the results for dissolved metals in ground water should be based on filtered samples even if both filtered and unfiltered sets are presented in a report.

5.16 Add any necessary preservative(s) to the appropriate container(s) prior to, or after (preferred), the collection of the sample, unless the appropriate preservative(s) have already been added by the laboratory before shipment.

5.17 Collect quality control (QC) samples as required in the work plan to monitor sampling and laboratory performance. Refer to the SOP for Collection of Quality Control Samples.

5.18 Conduct field analyses after sample collection is complete by measuring and recording the temperature, conductivity, pH, etc. (as called for in the work plan). Note and record the "final" physical appearance of the water (after purging and sampling) on an appropriate field form and in the field notebook.

5.19 Wipe the well cap with a clean rag, replace the well cap and protective cover (if present). Lock the protective cover.

5.20 Verify that each sample is placed in an individual "zip-lock" bag, wrapped with "bubble wrap," placed in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the analytical laboratory.

5.21 Decontaminate bailers, hoses, and pumps as discussed in the decontamination SOP. Wrap decontaminated equipment with a suitable material (e.g., clean plastic bag or aluminum foil). Discard cords, rags, gloves, etc. in a manner consistent with site conditions.

5.22 Complete all necessary field forms, field notebook entries, and the chain-of-custody forms. Retain one copy of each chain-of-custody form. Secure the cooler with sufficient packing tape and a custody seal.

5.23 Samples collected from Monday through Friday will be delivered within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Consult the work plan to determine if any of the analytes require a shorter delivery time.

END OF PROCUDURE

APPENDIX C

Proposed Groundwater Monitoring Plan

June 20, 2023

Mr. Dan McNally
Project Manager
Division of Environmental Remediation
New York State Department of Environmental Conservation (DEC)
625 Broadway, Albany, New York 12233-5060

Re: Proposed Ground Water Monitoring Plan
Former FO Pierce (C241251)
2-33 50th Avenue, Long Island City, New York

Dear Mr. McNally:

Roux Environmental Engineering and Geology, D.P.C. (herein referred to as Roux) is presenting the below groundwater monitoring plan following the installation of the building foundation and site cover system, on behalf of The Vorea Group (herein after referred to as Client). This groundwater monitoring plan calls for the installation of 7 monitoring wells, four monitoring wells to cover the Track 1 portions of the site, and three monitoring wells to cover the Track 4 portion of the site while maintaining proximity to the areas of concern. The proposed well locations are meant to provide coverage of the post remedial groundwater conditions throughout the site following shutdown of the construction dewatering influence and recharge of ambient groundwater to the pre-dewatering elevation.

Task 1 – Installation of Ground Water Monitoring Wells

AARCO Environmental Services Corp.(AARCO) will install 2" PVC wells with 10 feet of screen, 20 slot, set 8 ft below the water table and 2 feet above the water table at each location. Groundwater level is anticipated to be encountered at +1.21' elevation once recharge is complete. After installation, the annular space surrounding the well screen will be filled with sand with a 2-foot grout seal and a flush mount steel monitoring well cover will be installed at grade. A Geoprobe 420M and a Geoprobe 610 handcart rig will be utilized to complete the well installations. Well locations for GW-01 and GW-02 will be installed within a small street level access corridor that runs north to south along the western perimeter of the site (indoor). Well location for GW-03 through GW-7 will be located outdoors within the sidewalk surrounding the property. All well locations are included as attachment #1.

Roux field staff will screen soil using a handheld PID and document all findings, observations and well construction dimensions on the well construction logs.

Task 2 – Implementation of Ground Water Monitoring Plan

Following installation of the wells, Roux will implement the Ground Water Monitoring Plan(GWMP) which includes 4 groundwater sampling events conducted by Roux field staff. The GWMP will begin after the dewatering system is shut down and after groundwater is allowed to recharge to ambient levels. Sampling events are outlined below:

1. The first ground water sample will be collected from each of the seven wells following ground water recharge;
2. The second sampling event will occur 4 months after the initial sample;
3. The third sampling event will occur 4 months after the second; and
4. The final sampling event will occur 4 months after the third.

209 Shafter Street ■ Islandia, New York 11749 ■ +1.631.232.2600 ■ www.rouxinc.com
California ■ Illinois ■ Massachusetts ■ New Jersey ■ New York ■ Texas ■ Virginia

All QA/QC sampling protocols will be followed at each sampling event as directed by the previously approved RI dated July 7th 2021. Table 1 has been included as an reference to the approved RI to highlight the QA/QC groundwater sampling schedule.

Task 3 – Analysis and Reporting of Findings

Sample results will be submitted electronically to NYSDEC for review following each round of sampling within one month. Following the 4th round of sampling, all ground water data will be validated by a Roux Validator and summarized in a Groundwater Monitoring Plan Summary Report. The report will highlight all findings and data results related to the implementation of this Proposed Groundwater Monitoring Plan. All samples will be analyzed by Alpha Analytical Laboratories Labs for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and total metals and compared against Ambient Water-Quality Standards and Guidance Values (AWQSGV).

In the event the summary report includes data showing acceptable results when compared to AWQSGV, the report will include a petition to cease sampling and decommission the wells permanently.

In the event the summary report includes data showing unacceptable results when compared to AWQSGV, dependent on the severity of the elevated pollutants, the report will include a treatment plan utilizing targeted chemical injections and extension of the proposed sampling plan.

If this proposed plan is acceptable or you require further clarity please contact Alexander Policastro by telephone at (516) 375-5580, or by email at apolicastro@rouxinc.com.

Sincerely,

ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY, D.P.C.

Alexander Policastro, P.E.
Senior Engineer

Charles J. McGuckin, P.E.
Principal Engineer / Vice President

Table 1. Field and Laboratory QC Summary

QC Check Type	Minimum Frequency	Use
Field QC		
Duplicate	1 per matrix per 20 samples or SDG*	Precision
Trip Blank	1 per VOC cooler	Sensitivity
Field Blank (non-PFAS)	1 per matrix per 20 samples	Sensitivity
Field Blank (PFAS)	1 per matrix per day	Sensitivity
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

PFAS - Per- and Polyfluoroalkyl Substances

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor, Albany, NY 12233-7016
P: (518) 402-9767 I F: (518) 402-9773
www.dec.ny.gov

SENT VIA EMAIL

June 27, 2023

50th & 5th LIC LLC
Attn: Stephen Ohnemus
184 North 8th Street
Brooklyn, New York 11211

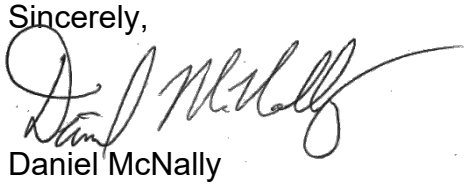
Re: Former FO Pierce Company
Site ID No. C241251
Long Island City, New York
Proposed Groundwater Monitoring Plan

Dear Stephen Ohnemus:

The New York State Department of Environmental Conservation (Department) and the New York State Department of Health (NYSDOH) have reviewed the Groundwater Monitoring Plan letter for the Former FO Pierce Company Brownfields Cleanup Program site dated June 20, 2023, and prepared by Roux Environmental Engineering and Geology, D.P.C. on behalf of 50th & 5th LIC LLC. The Department and the NYSDOH conditionally approve the plan provided that dissolved metals are analyzed and reported on in addition to the total metals cited in the document. Lastly, all attachments need to be included as part of a revised final submittal such as the previously agreed upon monitoring well locations figure.

If you have any questions, don't hesitate to reach out to me at (518) 402-9767 or daniel.mcnally@dec.ny.gov.

Sincerely,



Daniel McNally
Project Manager, Remedial Bureau B
Division of Environmental Remediation

ec:

Douglas MacNeal, NYSDEC
Dan McNally, NYSDEC
Scarlett McLaughlin, NYSDOH
Harolyn Hood, NYSDOH
Stephen Ohnemus, Applicant's representative – s.ohnemus@vorea.com
Alex Policastro, Applicant's consultant – apolicastro@rouxinc.com
Peter Papamichael, Applicant – p.papamichael@vorea.com

APPENDIX G

Site Management Forms

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

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**

ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY D.P.C.

SITE-WIDE MONITORING, INSPECTION, AND MAINTENANCE FORM

Client: **Vorea**
Location: **2-33 50th Avenue, Long Island City, New York**
BCP Site # **C241251**
Inspector:
Date:

Site Observations:

Yes	No	
[ ]	[ ]	Have any site improvements been made since the last inspection?
[ ]	[ ]	Has there been any maintenance activity impacting the institutional and/or engineering controls? -Include sketches or photos of observations

Inspection of Building Covers and Asphalt/Concrete Caps:

Yes	No	
[ ]	[ ]	Were all buildings inspected?
[ ]	[ ]	Were significant cracks observed?
[ ]	[ ]	Was any other damage observed? If yes, refer to Page 3 for additional clarification.
[ ]	[ ]	Were any new slab penetrations observed? If yes, include description on Page 3. -Include sketches or photos of observations

Inspection of Groundwater Usage:

Yes	No	
[ ]	[ ]	Is groundwater underlying the property being used for any purposes including, but not limited to, drinking water or industrial purposes?

Include additional information and details on Page 3 of this inspection form if the response to any of the above questions warrants additional explanation.

ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY D.P.C.

SITE-WIDE MONITORING, INSPECTION, AND MAINTENANCE FORM

Client: **Vorea**

Location: **2-33 50th Avenue, Long Island City, New York**

BCP Site # **C241251**

Inspector:

Date:

Inspection of Remaining Contaminated Material:

Yes	No	
[ ]	[ ]	Have there been any activities that caused a disturbance of remaining contaminated material since the last inspection?
[ ]	[ ]	If yes, were the activities conducted in accordance with the Site Management Plan (SMP)? -Include sketches or photos of observations

Inspection of Gardens and Farming:

Yes	No	
[ ]	[ ]	Is there any evidence of vegetable gardens and/or farming at the property (aside from raised planters)? -Include sketched or photos of observations.

Site Records:

Yes	No	
[ ]	[ ]	Are site records up to date (e.g., Site Inspection Checklists)?

Inspection of Property Usage:

Yes	No	
[ ]	[ ]	Is the property being used for any purposed other than restricted residential, commercial, and/or industrial use?

Include additional information and details on Page 3 of this inspection form if the response to any of the above questions warrants additional explanation.

ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY, D.P.C.

SITE-WIDE MONITORING, INSPECTION, AND MAINTENANCE FORM

Client: **Vorea**

Location: **2-33 50th Avenue, Long Island City, New York**

BCP Site # **C241251**

Inspector:

Date:

Site Observations

Additional Comments or Clarification Where Corrective Actions May Be Required:

ROUX

Well Sampling Data Form

Client: _____ **Project Number:** _____

Site Location: _____

Well No: _____ Weather: _____

Date: _____ Purge Water Disposal: _____

Sampled By: _____ Well Diameter / Type: _____

Depth of Well (ft): _____ Water Column (ft): _____

Depth to Water(ft): _____ Volume of Water in Well (gal) _____

Depth to Product (ft): _____ Volume of Water to Remove (gal): _____

well diameter:	1 in	2 in	4 in	6 in	8 in
gallons per foot:	0.041	0.163	0.653	1.469	2.611

Start Purging: _____ Purge Rate: _____

End Purging: _____ Volume of Water Removed (gal): _____

Method of Purge: _____ Method of Sampling: _____

Physical Appearance/ Comments: _____

Samples Collected: (analyses / no. bottles) _____

Time: _____ Laboratory : _____

Field Measurements:

Time	DTW ft	Flow Rate ml/min	ORP mV (+/- 10 mV)	Conductivity mS/m - S/m (w/in 3%)	Turbidity NTU (w/in %10)	pH SU (+/- 0.1)	Temperature C^o - F^o (w/in 3%)	Dissolved O_2 mg/L (w/in 10%)

ROUX

APPENDIX H

Request to Import/Reuse Fill Material Form

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e). Use of this form is not a substitute for reading the applicable 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 would pass a size 10 sieve? Choose an item

Does it contain less than 10%, by weight, material that would pass 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

Revised August 2014