204 4th Avenue Site

KINGS COUNTY

BROOKLYN, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C224295

Prepared for:

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New York, New York 10003

&

Speedway LLC

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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 ERIK DEE-OLSEN 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).

088835 P.E.

12/19/23 DATE

204 4th Avenue
KINGS COUNTY
BROOKLYN, NEW YORK

SITE MANAGEMENT PLAN

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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
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	Remedial Investigation
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
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

ES EXECUTIVE SUMMARY

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

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Institutional Controls:	1. The property may be used for Restricted-Residential use;
	2. ECs must be operated and maintained as specified in this SMP; ECs must be inspected at a frequency and in a manner defined in the SMP; The property may be used for: Restricted-Residential use;
	3. All ECs must be operated and maintained as specified in this SMP;
	4. All ECs must be inspected at a frequency and in a manner defined in the SMP;
	5. 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. The building at the Site is connected to the New York City Department of Environmental Protection public water supply and the request for the use of groundwater on site is not anticipated;
	6. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
	7. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
	8. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
	9. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
	10. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP,

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	11. 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;
	12. The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on the survey included in the environmental easement, and any potential impacts that are identified must be monitored or mitigated; and.
	13. Vegetable gardens and farming on the Site are prohibited.
Engineering Controls:	1. Cover system
	2. Sub-Slab Depressurization System (SSDS).

Inspections:	Frequency
1. Cover inspection	Annually
Monitoring:	
1. Groundwater Monitoring (MW001 through MW006)	Quarterly for first 2 years at minimum; frequency thereafter to be determined in consultation with NYSDEC.
2. SSDS	Annually during the heating season.
Maintenance:	
1. SSDS maintenance	As Needed
Reporting:	
1. Periodic Review Report	16 Months after issuance of COC, then Annually.

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2. Groundwater Monitoring Report	Quarterly for first 2 years at minimum; frequency thereafter to be determined in consultation with NYSDEC.

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 post-remedial program at the 204 4th Avenue site located in Brooklyn, New York (hereinafter referred to as the "Site"). The Site is currently enrolled in the New York State Department of Environmental Conservation's (NYSDEC) Brownfield Cleanup Program (BCP) as Site No. C224295.

204 4th Avenue LLC and Speedway LLC entered into a Brownfield Cleanup Agreement (BCA), Index No. C224295-07-19, each as a "Participant", with the New York State Department of Environmental Conservation (NYSDEC) on August 23, 2019, to investigate and remediate the Site. The BCA was subsequently amended three times, the dates and reasoning for these BCA amendments are as follows:

- Amendment 1 – January 20, 2020: Transferred site ownership from Speedway, LLC to 204 4th Avenue, LLC
- Amendment 2 – November 15, 2023: Recognized the Site's TPC an affordable housing project.
- Amendment 3 – December 7, 2023: Reduced the overall size of the BCP Site from approximately 19,000 square feet (0.436 acres) to approximately 17,845 square feet (0.410 acres) by excluding the Metropolitan Transportation Authority's easement area along 4th Avenue.

The Site is located in the Gowanus Neighborhood of Kings County, New York and is within the tax lot identified as Block 434 and Lot 35 on the New York City Department of Finance (NYCDOF) Tax Map. The Site measures approximately 17,845 square feet (0.410 acres) in area and is bounded by Sackett Street to the north, Union Street to the south, 4th Avenue to the east, and commercial properties to the west.

A figure showing the Site location is included as **Figure 1** and a figure illustrating the boundaries of this BCA 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 and on the Environmental Easement Survey provided in **Appendix D**.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination." Institutional and Engineering Controls (ICs and ECs) have been incorporated into the Site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC and recorded with the Office of the City Register of the City of New York on December 18, 2023 (CRFN Number 2023000329009) requires compliance with this SMP and 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 for the site, and thereby subject to applicable penalties.

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 A** of this SMP.

This SMP was prepared by PW Grosser Engineer & Hydrogeologist, PC (PWGC), on behalf of 204 4th Avenue LLC and Speedway LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation") 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 mitigation system, post-remedial removal of contaminated soil, or other significant change to the site conditions. 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 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:

8. 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.

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

Table A: Notifications*

Name	**Contact Information**	**Required Notification****
Steven Wu – NYSDEC Project Manager	(718) 482-6725 Steven.Wu@dec.ny.gov	All Notifications
Andre Obligado – NYSDEC Section Chief	(718) 482-4900 Andre.Obligado@dec.ny.gov	All Notifications
Kelly Lewandowski – NYSDEC Site Control	(518) 402-9569 Kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Daniel Tucholski - NYSDOH	(518) 486-7016 Daniel.Tucholski@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 the Gowanus Neighborhood of Kings County, New York and is within the tax lot identified as Block 434 and Lot 35 on the New York City (NYC) Tax Map. The Site measures approximately 17,845-square foot in area and is bounded by Sackett Street to the north, Union Street to the south, 4th Avenue to the east, and commercial properties to the west.

A site location map is included as **Figure 1** and a site plan illustrating the site's boundaries is included as **Figure 2**. The boundaries of the Site are more fully described in **Appendix D** – Environmental Easement. The owner of the Site parcel at the time of issuance of this SMP is:

- 204 4th Avenue LLC
  - Contact: Alex Cutrona, 215-435-9310, Alexander@averyhallinvestments.com.

There are currently no occupants or operators of this property as it is in the construction phase at the time of the issuance of the COC.

2.2 Physical Setting

2.2.1 Land Use

The Site is currently under development, and a new 12-story mixed-use residential and commercial building is being constructed. Adjacent properties to the Site consist primarily of mixed-use commercial and residential properties to the north, east, and south. The properties to the west are primarily commercial-retail locations. There are no schools, day care facilities, hospitals, or other sensitive receptors in the immediate vicinity of the subject Site. There are no rivers, streams, or wetlands in the immediate vicinity of the Site. The Gowanus Canal is the nearest surface water body to the Site located approximately 1/2-mile to the west.

2.2.2 Geology and Hydrogeology

The topography of the Site and surrounding area was reviewed from the USGS 7.5-minute series topographic map for the Brooklyn, New York quadrangle. The property elevation is approximately 25 feet above the National Geodetic Vertical Datum of 1988 (NGVD). Regional physiographic conditions are summarized below.

The geologic setting of Long Island is well documented and consists of crystalline bedrock composed of schist and gneiss overlain by layers of unconsolidated deposits. Immediately overlying the bedrock is the Raritan Formation, consisting of the Lloyd Sand confined by the Raritan Clay Member. The Lloyd Sand is an aquifer and consists of discontinuous layers of gravel, sand, sandy and silty clay, and solid clay. The Raritan Clay is a solid and silty clay with few lenses of sand and gravel; abundant lignite and pyrite; and gray, red or white in color.

Above the Raritan Clay lies the Magothy Formation. The Magothy Aquifer consists of layers of fine to coarse sand of moderate to high permeability, with inter-bedded lenses of silt and clay of low permeability resulting in areas of preferential horizontal flow. Therefore, this aquifer generally becomes more confined with depth. The Magothy Aquifer is overlain by the Upper Glacial Aquifer. The Upper Glacial Aquifer is the water table aquifer at this location and is comprised of medium to coarse sand and gravel with occasional thin lenses of fine sand and brown clay. This aquifer extends from the land surface to the top of the Magothy and, therefore, is hydraulically connected to the Magothy Aquifer.

Depth to groundwater in the underlying glacial aquifer is approximately 13 to 16 feet below ground surface (bgs). The lithologic description of the sediments from soil borings installed during previous investigations at the site identifies the materials as fine to coarse sands with gravel, concrete, brick, and glass, typical of historical fill down to depths of 20 to 22 feet below grade. Beneath the historic fill is a layer is native sandy clay with organic matter (wood, roots, etc.) present within the matrix.

2.3 Environmental Investigation History

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

Summary of February 2019 Phase I ESA

Phase I Environmental Site Assessment (ESA) activities were conducted in February 2019 by PWGC. The Phase I ESA identified the historical use of the Site as a gasoline station as a recognized environmental condition (REC). The use and storage of hazardous materials and/or petroleum products (e.g., USTs, drum storage) has been documented at the site. Multiple releases of these substances have been reported. There are five historical spill numbers associated with this Site, with one spill currently active (#9605719), which was opened on August 2, 1996, after gasoline impacts were observed in the soil and groundwater during a UST upgrade project.

The Phase I identified an October 1998 Site Assessment Report Prepared by Groundwater & Environmental Services, Inc. (GES) which reported the removal of four 4,000-gallon USTs, two 2,000-gallon USTs, thirty-six 550-gallon steel gasoline USTs, one 550-gallon wastewater UST, and the on-site abandonment of one 2,000-gallon fuel-oil UST with concrete slurry. At this time, the UST system was replaced with four 4,000-gallon gasoline USTs, one 4,000-gallon diesel USTs, and one 550-gallon wastewater UST. NYSDEC Spill #9605719 was subsequently opened following the discovery of impacted media. Remedial efforts following the discovery of the spill included the removal of approximately 855 tons of petroleum impacted soil and the installation of eight groundwater monitoring wells on-Site.

Summary of April 2019 Phase II ESA

As recommended in the Phase I ESA, a Phase II ESA was conducted in April 2019 by PWGC. The scope of this Phase II consisted of a geophysical survey, soil and groundwater sampling, and soil vapor sampling. The geophysical survey identified three anomalies, two south of the storage building that appeared to be areas of soil disturbance and the third east of the active USTs and appeared to be the location of the former 550-gallon wastewater UST. No evidence of the thirty-six 550-gallon former USTs was identified, supporting the belief that these USTs were removed in 1996 as documented in the GES 1998 Site Assessment Report. Analytical results from soil and groundwater samples collected at the site indicate petroleum contamination is present to depths of 21 feet bgs. VOCs, SVOCs, and metals were detected at concentrations above Restricted-

Residential soil cleanup objectives (SCOs). Petroleum VOC soil vapor impacted was identified at the Site, namely elevated concentrations of 2,2,4-trimethylpentane, on the northern and western portion of the Site.

Summary of December 2021 Remedial Investigation (RI)

PWGC performed an RI at the Site in November 2019 and additional investigation activities were performed in June 2021 and September 2021. The purpose of the RI was to evaluate the extent of soil and groundwater impact within the Site boundary and to evaluate if soil vapor is affecting neighboring properties. The tasks and findings are summarized as follows:

- A total of 10 soil borings were installed at the Site as part of this RI. Borings were installed from grade surface to a depth of 27 feet below grade. Samples were collected for laboratory analysis from the 2–4-foot, 12–14-foot, 19–21-foot, and 25–27-foot intervals at each location, and the 30–32-foot interval at three locations where petroleum related VOCs were identified at the 25–27-foot interval after the initial sampling effort in February 2020. Analytical results identified VOCs exceeding their respective Protection of Groundwater SCOs, as well as SVOCs, and metals at concentrations exceeding their respective Restricted-Residential SCOs. In general, the highest concentrations of VOCs were detected in the intermediate and deep interval soils in the vicinity and down gradient of the former UST locations. SVOCs and metals were detected at concentrations greater than detection limits at each soil boring and at each interval. The highest concentrations of SVOCs were present in the shallow and intermediate intervals and concentrations of metals above detection limits were present in all four sampling intervals with the native material interval being the least impacted. VOCs were not identified at concentrations exceeding Protection of Groundwater SCOs at the 30–32-foot interval.
- Three clusters of step-out borings were performed to delineate the extent of contaminants of concern at locations identified in the Phase II ESA prepared for the Site. Step-out borings were performed in the areas

around SB002, SB003, and MW-7. Analytical results for step-out samples collected from the areas of SB002 and SB003 yielded concentrations of metals in exceedance of Restricted-Residential SCOs, including concentrations of arsenic, lead, and mercury exceeding Restricted-Residential SCOs in the 25–27-foot interval. Based on the results of the step-out boring samples collected from the region of MW-7, there is not a significant source of arsenic near this location.

- Eight groundwater samples were collected for laboratory analyses including four monitoring well samples and four discrete groundwater samples. Groundwater samples were collected for VOCs, SVOCs, and total and dissolved metals. VOC compounds detected were indicative of petroleum impact with the highest degree of impact located in and directly downgradient of the former UST areas. SVOC and total metal concentrations above NYSDEC Ambient Water Quality Standards (AWQS) were identified across the site. The presence of dissolved metals in groundwater was limited to arsenic at MW-2.
- Two step-out groundwater samples were collected in the vicinity of MW-7 and analyzed for total and dissolved arsenic. Concentrations of dissolved arsenic in the groundwater samples collected from the step-out borings near MW-7 were below AGWQS.
- An off-site soil vapor intrusion study was performed by EnviroTrac to investigate if elevated concentrations of petroleum VOCs detected in soil vapor samples collected during the Phase II ESA have impacted soil vapor quality beneath the neighboring properties. EnviroTrac was the environmental consultant for Speedway, the former owner of the property who was responsible for conducting off site activities. Soil vapor samples were collected from beneath the sidewalk opposite Sackett Street to the north of the Site, and sub-slab soil vapor and indoor air samples were collected from 652 Sackett Street and 649 Union Street. Analytical results for this off-site soil vapor investigation did not indicate that a soil vapor intrusion condition exists beneath the neighboring properties.

2.4 Environmental Remediation History

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

Summary of IRM – Underground Storage Tank Removal

Under a NYSDEC-approved IRM Work Plan dated September 2019, PWGC oversaw the performance of this IRM in October 2019 which included the cleaning and removal of five gasoline USTs, one diesel UST, and one 550-gallon wastewater UST at the Site along with the associated piping and pump dispensers. These USTs previously serviced the Speedway gasoline station which occupied the Site until October 2019.

Endpoint samples and field observations collected during this IRM from beneath the concrete slab which underlaid the USTs at approximately 13 feet below grade exhibited evidence of gasoline contamination. These areas were incorporated into the activities performed under the June 2022 RAWP. The USTs and associated piping and dispensers removed during this IRM appeared to be in good condition. It was determined that source of the observed gasoline impacts in the subsurface beneath the concrete UST pad was related to impacts from NYSDEC Spill #9601719 (e.g., from the historic 550-gallon USTs that had been previously removed circa 1998, and not from the recently removed USTs.

This IRM included the importation of approximately 220 cubic yards of clean backfill sand to fill the excavation where the USTs were once located. Since this material was not analyzed for PFAS prior to its importation to the Site, NYSDEC instructed the participants that this imported material must be removed during future remedial activities following the submission of the July 2022 IRM Report. This imported soil was removed during the activities performed under the June 2022 RAWP.

The work performed under this IRM was documented in a July 2020 IRM Completion Report prepared by PWGC and approved by NYSDEC in March 2021.

Summary of IRM – Groundwater Treatment (Chemical Injections)

Under a NYSDEC-approved IRM Work Plan dated February 2022, PWGC oversaw the performance of this IRM in February and March 2022 which included the injection of PetroFix, a petroleum-targeting remediation product, to the subsurface. The chemical injection program was carried out at the Site in effort to enhance the degradation of petroleum chemicals entrained in the subsurface of the Site associated with its historical property use as a gasoline station and in association with open NYSDEC Spill #9605719. The remediation program included installation of 189 injection points distributing approximately 40,000 pounds of PetroFix across the Site.

To document the effectiveness of the remedial work, groundwater monitoring was performed in April 2022, May 2022, and August 2022, per the requirements of the IRM Work Plan, following the injection activities.

The work performed under this IRM was documented in a July 2023 IRM Completion Report prepared by PWGC and approved by NYSDEC in August 2023.

Summary of Remedial Action Work Plan Activities

Under the NYSDEC-approved Remedial Action Work Plan dated June 2022 and the June 2022 Decision Document, PWGC oversaw implementation of the remedial activities at the site, which included:

1. Performance of a waste characterization / delineation soil sampling program to facilitate the removal and off-site disposal of impacted soils.
2. Removal of a previously abandoned 2,000-gallon UST located on the northern portion of the property, and a previously unknown 275-gallon UST on the northern portion of the property.
3. Installation of support-of-excavation (SOE) and a dewatering system to support remedial excavation to the necessary depth of 18 feet below grade.
4. Excavation of petroleum impacted soil/fill associated with NYSDEC Spill #9605719 exceeding NYSDEC Protection of Groundwater SCOs to a depth of 18 feet below grade in the central portions of the Site, and excavation of the upper two feet of soil/ fill exceeding Restricted-Residential SCOs across the remainder of the Site. Backfill sand which was imported following the UST

removal activities performed during the July 2020 IRM was also removed during these excavation activities.

5. Implementation of a CAMP during earth-disturbing work.
6. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of excavated soil during intrusive work.
7. Collection and analysis of confirmatory endpoint samples and sidewall samples to evaluate the performance of the remedy with respect to attainment of Site-specific SCOs and to document the remaining soil contamination which will be addressed by the Site's cover system.
8. Earth Construction Services LLC (ECS) of Mount Kisko, New York was hired to install, manage, and maintain a groundwater dewatering system at the site to facilitate excavations beyond the depth of the groundwater table. The dewatering system included a network of well-points which were used to pump groundwater into a treatment system consisting of a settling tank and carbon filtration units. Dewatering was performed under an NYCDEP dewatering permit and a NYSDEC LI-Well Permit.
9. Appropriate handling, transportation, and disposal of contaminated materials removed from the Site in accordance with Federal, State, and local rules and regulations.
10. Import and placement of crushed stone in over-excavated areas to establish the development grade.
11. Responsibilities associated with the remedial action, including permitting and pretreatment requirements, were addressed in accordance with applicable Federal, State, and local rules and regulations.
12. Construction of Site-wide cover system to prevent direct contact with contaminated media comprised of the foundation slab and walls for the newly constructed building.

13. Installation of a SSDS to mitigate against potential vapor-phase petroleum impact from entering the building. A vapor barrier was installed beneath the foundation of the building as an element of construction.
14. Installation of six groundwater monitoring wells to monitor the effectiveness of the remedial measures on groundwater quality.
15. Submission of this Site Management Plan (SMP).
16. Submission of a Final Engineering Report (FER) and environmental easement to NYSDEC under a separate cover.

2.5 Remedial Action Objectives

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) were identified for this Site.

2.5.1 Groundwater

RAOs for Public Health Protection:

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

RAOs for Environmental Protection:

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

2.5.2 Soil

RAOs for Public Health Protection:

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

RAOs for Environmental Protection:

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

2.5.3 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 the Site.

2.6 Remaining Contamination

2.6.1 Soil

Following the implementation of the RAWP, end-point sample results demonstrated that VOC concentrations in soil/fill at the Site meet Protection of Groundwater SCOs, and pesticide, PCB, and PFAS concentrations meet Restricted-Residential SCOs or guidance values. However, due to the presence of historic fill across the Site beyond the planned remedial and/or development excavation depth, concentrations of metals (barium, lead, and mercury) and SVOCs (such as benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene) remain at concentrations exceeding Restricted-Residential SCOs. Endpoint and sidewall samples which contained concentrations of SVOCs and/or metals exceeding Restricted-Residential SCOs included each endpoint and sidewall sample with the exception of SW002, SW003, and SW006.

Based on soil analytical results, a site cover system is required to prevent direct human contact with remaining contaminated soil/fill beneath the Site. The site cover system overlays the vapor barrier, which was installed as a best construction practice and resiliency measure and not as an engineering control, as well as the SSDS components beneath the areas with slab-on-grade foundations.

Table 1 through 6 includes endpoint sample soil analytical data and **Figure 3** summarizes the results of soil samples collected that exceed the Restricted Residential Use SCOs at the Site after completion of the remedial action.

2.6.2 Groundwater

A new network of six groundwater monitoring wells, MW001 through MW006, were installed at the Site to monitor the long-term effectiveness of the remedial activities on groundwater quality. Post-remedial groundwater sampling was performed on July 13, 2023; August 8, 2023; and October 4, 2023. Groundwater samples were analyzed for NYSDEC CP-51 List VOCs for petroleum constituents by York Analytical Laboratories. Analytical results were compared to NYSDEC Ambient Groundwater Quality Standards (AWQS). The results of the groundwater sampling demonstrated that concentrations of VOCs were less than AWQS at MW001, MW002, MW005, and MW006. VOC concentrations were generally below AWQS at MW003 and MW004 with the exception

of MTBE, which was reported at a concentration of 440 ug/L and 20.5 ug/L, respectively; naphthalene at MW003, which was reported at a concentration of 16.6 ug/L; and benzene at MW003, which was reported at a concentration slightly exceeding its respective AWQS at 1.3 ug/L.

Table 7 includes groundwater sampling analytical results collected from the site in 2023. The locations of the six monitoring wells at the site are summarized in **Table C** and **Figure 4**.

2.6.3 Soil Vapor

During the subsurface investigations performed as part of a Phase II ESA in 2019, elevated concentrations of a petroleum-related compound, 2,2,4-trimethylpentane, were detected in soil vapor samples collected at the Site. Although the applicable NYSDOH guidance does not include a standard for this compound, NYSDOH requested that an active SSDS be installed at the Site as the detected concentration was significant. To mitigate against potential soil vapor intrusion of this compound at the new development, SSDS piping was installed beneath the slab-on-grade portion of the building which will be activated during the post-remedial site management phase of this project. This SMP will be updated as necessary following the activation of this system.

Table 8 and **Figure 6** summarizes the results of soil vapor concentrations detected from the 2019 Phase II ESA.

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 IC/ECs on the Site;
- The basic implementation and intended role of 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 B** for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Other provisions necessary to identify or establish methods for implementing the IC/ECs required by the Site remedy, as determined by the NYSDEC project manager.

3.2 Institutional Controls

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

1. The property may be used for: Restricted-Residential 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 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. The building at the Site is connected to the New York City Department of Environmental Protection public water supply and the request for the use of groundwater on site is not anticipated;

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 the survey included in the environmental easement, and any potential impacts that are identified must be monitored or mitigated; and;

12. Vegetable gardens and farming on the Site are prohibited.

3.3 Engineering Controls

3.3.1 Site Cover

Exposure to remaining contamination at the Site is prevented by a cover system placed over the Site. This cover system is comprised of concrete building slabs and foundation walls which extend across the entire property. **Figure 7** presents the location and details of the cover system. The cover system is also detailed in the As-Builts included in **Appendix**

I. The entire footprint of the new building was constructed with a vapor barrier membrane which was installed as a best construction practice and resiliency measure.

The Excavation Work Plan (EWP) provided in **Appendix B** 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 B**. 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 Sub-Slab Depressurization System

The piping components for a Sub-Slab Depressurization System (SSDS) have been installed below the concrete foundation slab of the slab-on-grade portion of the building. The SSDS was not installed beneath the basement level as piping at this elevation would be susceptible to being inundated with groundwater which would prevent the SSDS from functioning, as well as potentially causing damage to the system. The SSDS will serve as an active vapor mitigation system for the new building against potential residual petroleum-impacted vapor in the subsurface.

The SSDS is designed to vent volatile compounds in the vapor phase from under the building foundation and prevent the volatile compounds from entering the building. The SSDS utilize an in-situ process employing a network of sub-slab perforated collection piping where a blower is utilized to create a negative pressure gradient that causes the movement of vapors toward the collection piping. The volatile constituents are removed from the subsurface through the riser pipe connected to the network of collection pipes. The extracted volatile compounds are then discharged to the atmosphere above the roofline.

The SSDS piping is constructed of perforated 4-inch-diameter high-density polyethylene (HDPE) and piped to a riser pipe that extends above the base floor. The

subgrade perforated piping is shrouded in ½ inch-crushed stone, which also underlays the extent of the slab-on-grade portion of the building to allow for vapors to move with minimal resistance into the SSDS. In addition, four permanent vacuum monitoring/sub-slab vapor sampling points (VMP-1, VMP2, VMP-3, and VMP-4) have been installed into the floor of the slab-on-grade portion of the building to gauge the effectiveness of the SSDS when it is operating. The vacuum monitoring points are comprised of steel vapor pins installed through the foundation to allow for access to subsurface air/vapor conditions. These points are used to measure the vacuum influence of the SSDS and are used as sub-slab vapor sampling locations.

During the installation process of the SSDS, the components of the system were inspected to ensure proper installation of the equipment. **Figure 7** illustrates the location of the subgrade piping of the SSDS. Engineering As-Builts of the SSDS piping are included in **Appendix I.** The above-grade components of the SSDS will be installed in accordance with the design drawings included in this SMP as part of ongoing building construction. Once the SSDS is operational, this SMP will be amended with updated As-Builts of the SSDS.

Procedures for starting up, operating, and maintaining the SSDS system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a PE who is licensed and registered in New York State, are included in **Appendix I** – Operations and Maintenance Manual. **Figure 6** shows the location of the ECs for the site.

3.3.3 Criteria for Termination of Remedial and/or Mitigation Systems

Generally, remedial and/or mitigation 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 and/or mitigation 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/or recovery wells per the NYSDEC CP-43 policy.

The remedial party will also conduct any needed site restoration activities, as necessary, such as asphalt patching and decommissioning remedial and/or mitigation system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the Site. As the Site is constructed with concrete foundation which extends over the entirety of the property, restoration activities, if required, will be limited to concrete foundation repairs.

3.3.3.1 Site Cover

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

3.3.3.2 SSDS

The SSDS will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH project managers. If monitoring data indicates that the SSDS may no longer be required, a proposal to discontinue the SSDS will be submitted by the remedial party to the NYSDEC and NYSDOH project managers.

3.3.3.3 Groundwater Monitoring Wells

Groundwater monitoring activities to assess post-remedial attenuation will continue, as determined by the NYSDEC project manager in consultation with the NYSDOH project manager, until residual groundwater concentrations are found to be consistently below ambient water quality standards, the Site SCGs, or have become asymptotic at an acceptable level over an extended period. In the event that groundwater monitoring data indicates that such monitoring may no longer be required, a proposal to discontinue the monitoring 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 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 appropriate media (e.g., groundwater, indoor air, soil vapor);
- Assessing compliance with applicable NYSDEC and NYSDOH standards, criteria and guidance (SCGs), particularly groundwater standards and soil vapor/indoor air guidance values; 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 and SSDS;
- Monitoring well and SSDS 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 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 H** – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- 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 remedial, mitigation and monitoring 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.

Monitoring of the cover system, SSDS, and monitoring well network will be performed on a routine basis, as identified in Table B Remedial System Monitoring

Requirements and Schedule (see below). The monitoring of remedial systems must be conducted 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. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of any engineering control system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The remedial and/or mitigation system components to be monitored include, but are not limited to, the components included in Table B below.

Table B – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Cover System	Concrete integrity, cracks, observed breaches.	No mechanical components.	Annual at minimum
SSDS	Vacuum blower, piping, vacuum gauges, vacuum/vapor monitoring points	Blower flow rate: 750-1,500 CFM. Blower pressure: 11-22 inches of WC. VMPs: Minimum 0.02 inches of WC.	Monthly
Groundwater monitoring network	Cover/seal condition, damage to riser, biofouling/siltation, Obstructions.,	No mechanical components.	Quarterly

Reporting requirements are outlined in Section 7.0 of this SMP. 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 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 EC Monitoring and Sampling

4.3.1 Composite Cover System Monitoring

The composite cover system, which is comprised of the concrete building slab and foundation walls, will be monitored annually to document existing conditions of the cover system and to ensure that the cover system is not breached without proper notification and oversight. The cover system is in place to prevent human exposure to remaining contaminated soil/fill beneath the building at the Site.

The cover system will be inspected at a minimum of once a year. The status, including the existing condition and signs of past excavation patching of the cover system, will be observed and recorded.

4.3.2 Groundwater Monitoring

Groundwater monitoring will be performed quarterly to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

The network of monitoring wells has been installed to monitor upgradient, on-site and downgradient groundwater conditions at the site. Two monitoring wells (MW-3 and MW-4) are located within the footprint of the remedial excavation zone within the building. Two wells (MW-5 and MW-6) are located on the sidewalk along Sackett Street on the downgradient portion of the site. One well (MW-1) is located on the sidewalk along Union Street on the upgradient portion of the site, and one well (MW-2) is located on the sidewalk along 4th Avenue in a cross-gradient position.

Due to the depth to groundwater at the Site of approximately 13 to 16 feet below

sidewalk grade, the monitoring wells MW-1, MW-2, MW-4, MW-5, and MW-6 were installed utilizing a Geoprobe 7822 drill rig and constructed of 2-inch-diameter PVC riser pipe from grade to a depth of 10 feet below grade and then a ten-foot-long section of 0.010-mil slotted PVC well screen to the bottom of the well at 20 feet below sidewalk grade. One of the monitoring wells installed within the footprint of the building, MW-3, is made with the same material and have similar configurations with the exception of having less riser since the top of this well is located in the basement of the building. **Table C** summarizes the wells' identification numbers, as well as the purpose, location, depths, diameter and screened intervals of the wells. These wells were developed using a submersible pump to purge groundwater until turbidity readings stabilized and water was observed to be visibly clear. Monitoring well construction logs are included as **Appendix E**, the locations of the wells are illustrated on **Figure 4,** and a geologic cross section which illustrates the screen intervals of the wells is included in **Figure 5.**

Table C – 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
MW001	Upgradient	40.677584° N, 73.983234° W	2	20.26	20.43	10.26	0.26
MW002	Cross-gradient	40.677939° N, 73.982883° W	2	20.31	20.55	10.31	0.31
MW003	Remediation Area	40.677723° N, 73.983252° W	2	10.34	7.95	9.34	-0.66
MW004	Remediation Area	40.677939° N, 73.982883° W	2	21.77	21.98	10.77	0.77
MW005	Downgradient	40.677959° N, 73.983252° W	2	23.94	20.55	10.94	0.94
MW006	Downgradient	40.678171° N, 73.983107° W	2	20.04	20.12	10.04	0.04

4.3.3 Sampling Protocol

Prior to sampling, each well will be gauged with an electronic interface probe to measure the depth to water. Wells will be purged in accordance with low-flow procedures

using a decontaminated submersible pump, peristaltic pump, Waterra pump, or similar, fitted with disposal polyethylene tubing under low flow conditions. During purging, the groundwater parameters pH, temperature, conductivity, oxygen reduction potential (ORP), turbidity, and dissolved oxygen will be monitored every three minutes with a Horiba U52 water quality instrument or similar. When measurements stabilize in accordance with the United States Environmental Protection Agency (USEPA) standard operating procedure EQASOP-GW001, purging will be deemed completed and the Horiba will be disconnected. The groundwater samples will then be collected directly from the tubing and placed in pre-cleaned laboratory supplied glassware and packed in a cooler on ice and delivered to a NYSDOH ELAP-certified laboratory under chain-of-custody seal. The groundwater samples will be analyzed for TCL VOCs per USEPA Method 8260, TCL SVOCs per USEPA Method 8270, and Total Metals per USEPA method 6010/7471. Following each groundwater sampling event, a figure illustrating groundwater flow direction and pertinent analytical data will be generated.

4.3.4 Monitoring Well Repairs, Replacement, and Decommissioning

If biofouling or silt accumulation occurs in the on-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced (per the Monitoring and Sampling Plan) if an event renders the wells unusable or no longer required.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance. The wells will be purged as needed if it is observed that sediment infiltration into the interior of the wells has impacted its recharge capacity and/or overall performance.

The NYSDEC will be notified prior to repair or decommissioning of monitoring wells for the purpose of replacement, and such repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report (PRR). Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's Commissioner's Policy, "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered

unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

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.

4.3.5 Soil Vapor Intrusion Monitoring and Sampling

Soil vapor intrusion sampling will be performed annually during the heating season to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

The first round of soil vapor monitoring will be conducted once the ground floor of the new building, where the SSDS is located, is enclosed. The first round of testing and vacuum monitoring (e.g., pressure field extension testing) will be performed during the first heating season after the HVAC system has been activated but prior to occupancy of the building.

Monitoring of the SSDS will consist of recording gauge readings and collecting influent vapor samples. An Operations and Maintenance (O&M) Manual for the SSDS, detailing the specific gauges and meters to be recorded, is included in **Appendix I**. O&M will continue until the RAOs have been achieved. Modifications or shutdowns to the SSDS will be performed in consultation with the NYSDEC and NYSDOH.

A network of four vacuum monitoring points has also been installed at the Site to evaluate the effectiveness of the SSDS in creating negative pressure and a vacuum atmosphere in the subsurface which will mitigate soil vapor intrusion into the building. Locations of the vacuum monitoring points are shown on the SSDS As-Built engineering drawings included as **Appendix I**.

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 soil vapor intrusion sampling program are specified in Section 7.0 – Reporting Requirements.

4.3.6 Monitoring QA/QC and Sampling Protocol

Sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the Site (**Appendix F**). Main components of the QAPP include:

- QA/QC Objectives for Data Measurement.
- Sampling Program:
    - Sample containers will be properly washed, decontaminated, and appropriate preservatives will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservatives will be tagged as such.
    - Sample holding times will be in accordance with the NYSDEC ASP B requirements.
    - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Custody.
- Calibration Procedures:
    - Field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
    - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures.
- Preparation of a Data Usability Summary Report (DUSR), which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. Analytical data should be validated at a frequency of 5% of all samples or one sample per laboratory submission, whichever is greater.
- Internal QC and Checks.

- QA Performance and System Audits.
- Preventative Maintenance Procedures and Schedules.
- Corrective Measures.

A table summarizing the routine monitoring schedule is included in **Table D** below.

Table D – SSDS and Groundwater Monitoring Schedule

Sampling Location	**Schedule**				
	TCL VOCs TCL SVOCs, and TAL metals	Gauging	Vacuum Pressure	VOCs	Frequency
Sub-Slab Vapor Points			X	X	Annually (During Heating Season)
Indoor Air				X	Annually (During Heating Season)
Monitoring Wells	X	X			Quarterly

Please note that maintenance visits to tend to remedial and mitigation system may be performed at higher frequencies, as needed.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The SSDS is classified as a mitigation system and not a remedial system. Operation and Maintenance information regarding the SSDS is provided in **Appendix I** - Operation and Maintenance Manuals. A copy of the Operation and Maintenance Manual, along with this SMP, will be maintained at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the SSDS;
- Will be updated periodically to reflect changes in Site conditions or the manner in which the SSDS is operated and maintained.

Further details regarding the Operation and Maintenance of the SSDS is provided in **Appendix I** - Operation and Maintenance Manual.

5.2 SSDS

5.2.1 Operation and Maintenance of SSDS

The following sections provide a description of the operations and maintenance of SSDS. Cut-sheets and as-built drawings for the SSDS are provided in **Appendix I** - Operations and Maintenance Manual.

5.2.2 System Start-Up and Testing

Initial start-up and testing of the SSDS will be conducted before the building is occupied. Review of system components before and after start-up will be conducted, including but not limited to;

- Inspection of piping, fittings, and equipment to ensure there are no leaks;
- Review of equipment to ensure it is operating according to manufacturer's specifications;
- System balancing;
- Check that system alarms are functional;
- Inspection of vacuum monitoring points and collection of vacuum readings below the building slabs; and
- Collection of an influent and effluent sample approximately 24 hours after sustained system start-up.

The system testing described above will be conducted if, in the course of the SSDS lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.2.3 Routine System Operation and Maintenance

Routine O&M of the SSDS should be performed initially on a monthly basis for Months 1, 2 and, 3, and then annually thereafter and will include assessing the system's current condition.

A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The inspection should include review of system components including piping, concrete slab integrity, radon fans, vacuum monitoring points, and low vacuum alarms, to ensure components are functioning effectively. If leaks are observed, they should be immediately repaired. Additionally, the location of the exhaust vent should be observed to ensure no air intakes have been located within a 10 foot radius.

The system's performance will be monitored to ensure a proper minimum vacuum is observed at the vacuum monitoring points. Each vacuum monitoring point shall be tested for a minimum vacuum of 0.002 inches of w.c. If vacuum does not meet the minimum requirement of 0.002 inches of w.c., the system will be adjusted to meet the condition. Vacuum readings should be recorded on the O&M Logs included in the OM&M Plan attached as **Appendix I**. The SSDS will be equipped with a telemetry system once activated to alert the engineer of the system remotely of performance issues.

If the system is not operating per design, troubleshooting of the system will commence and deficient items will be corrected. It is anticipated that the SSDS will operate continuously until written approval from the NYSDEC and NYSDOH states otherwise. A routine yearly sampling and inspection schedule will be adhered to and documented in the following PRRs. The sampling and inspection visits will include the following:

- Collection of five indoor air samples from the locations illustrated on **Figure 6**. This sampling will be conducted during the heating season.
- Collection of vacuum readings from the vacuum monitoring points.

- Collection of influent vapor samples through a sampling port in the riser pipe.

The results of the routine SSDS sampling and inspection visits will be documented in the following PRR after each event.

5.2.4 Non-Routine Operation and Maintenance

In the event that non-routine maintenance is needed, the following information will be recorded and included in the subsequent status report:

- Description of the damage or malfunction;
- Level and duration of reduced effectiveness;
- Other repairs or adjustments made to the system

5.2.5 System Monitoring Devices and Alarms

The SSDS has a warning device to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSDS will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

5.2.6 SSDS Deactivation Protocol

Following the first year of routine sampling, the collection of indoor air samples may not be deemed necessary if the SSDS has proven to be effective. The discontinuation or reduction of indoor air sampling will be discussed with NYSDEC after these events are performed.

If it is deemed that the SSDS is no longer necessary to address vapor intrusion, then a SSDS shut-down assessment will be performed. This shut-down assessment will consist of the following steps in accordance with NYSDOH guidance:

- A shut-down assessment work plan, detailing the specifics of the SSDS pulsing and sampling methods, will be submitted to NYSDEC/NYSDOH for review and approval prior to the start of such efforts which will include:
    - Deactivation of the SSDS followed by a waiting period of a minimum of six-weeks to allow for neutral sub-slab conditions to be established.

- Following the six-week shut down period, a soil vapor intrusion assessment will be conducted during the heating season by collecting sub-slab samples from each of the four vacuum monitoring points along with the collection of five indoor air samples as illustrated on **Figure 7**.
- Restart of the SSDS following completion of the sampling noted above.
- Analytical results will be shared with the NYSDEC and NYSDOH for evaluation to determine if shut-down of the SSDS is acceptable.

5.2.7 Fire Safety

In the event of a fire or explosion, procedures will include immediate evacuation of the Site (air horn will sound for a single continuous blast) and notification to local fire and police departments. No Site personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage). Adhering to the following precautions will help prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL-approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on heavy equipment, in trailers and near hot work activities; and
- Monthly inspections of fire extinguishers.

The remedial party will conduct an annual facility walk with the local fire chief and/or fire suppression team. The site walk will allow for the addition of the facility to any local preplanning efforts. The NYSDEC project manager will be provided with the local fire chief's/fire suppression team's recommendations as soon as they become available.

Following review, the NYSDEC project manager may direct the remedial party to implement the recommendations and/or revise the 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 brief 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.

According to Effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No.3604970211F, the Site is not located within the 100-year or 500-year flood zones. As such, it does not appear that the Site is vulnerable to flooding.

Site erosion is not expected as the entirety of the property is covered with concrete foundations and the SSDS piping is greater than 10 feet above the groundwater elevation under the building. Therefore, the SSDS is not vulnerable to becoming inundated with water due to extreme, weather related fluctuations in groundwater levels. ECs will be inspected after severe weather or other emergency conditions (natural disasters or fires) that are known to have inflicted damage at the Site or adjoining properties and repaired, as necessary.

The SSDS will receive electrical service from Consolidated Edison, Inc. (Con Edison). A power loss and/or dips/surges in voltage during a severe weather event, including lightning strikes, may impact the SSDS equipment and operations. The SSDS system control panel will shut down the system in the event of a dip or surge in voltage. The SSDS will be equipped with a telemetry system to alert the PE/QEP of system malfunctions remotely.

Overall, the Site ECs are not expected to be vulnerable to the effects of global climate change, including severe weather and flooding events.

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 all green remediation evaluations to be completed for the Site during site management, and as reported in the Periodic Review Report (PRR).

Wastes which may be generated during site management will be limited to purge water from on-site monitoring wells, which will be containerized in 55-gallon drums and appropriately disposed of at an off-site facility.

The following items may be evaluated to determine if more energy efficient methods and/or equipment should be used:

- Energy Usage:
    - The power needed to run the SSDS blower. A more energy efficient blower model may replace the original blower if one becomes available which can accommodate the design and intended vacuum of the system.
- Emissions of SSDS and Monitoring Events
    - Monitoring of vapor phase emissions of the SSDS to determine if enhanced treatment is necessary.
    - Usage of battery powered groundwater sampling pumps or pumps which can use on-site electricity rather than a gas-powered generator.

Green methods which are performed during each monitoring period will be documented in the PRR.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at 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 Building Operations and Mitigation Systems

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption. Components to be evaluated should include, but are not limited to:

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

The site's active mitigation system, the SSDS will be operated as necessary, considering the current Site conditions, to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and the use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

6.2.3 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources. The following planned activities will help minimize the frequency of SMP-related events:

- Requesting reductions in sampling and/or monitoring frequency, if appropriate; Using telemetry systems to collect SSDS system data, and requesting full-time on-site staff to report noticeable observations associated with SMP components

(breach in site cap, severe dame to SSDS, etc.) A reduction in site visits will lower emissions associated with commuting.

- Using mass transit and carpooling to conduct site visits. This will lower the carbon footprint of such events.

6.2.4 Metrics and Reporting

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

6.3 Remedial System Optimization

A Remedial System Optimization (RSO) study will be conducted if 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 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;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- 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 H**. 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 E** and summarized in the Periodic Review Report.

Table E: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Groundwater sampling report	Quarterly within 30 days of the receipt of validated lab data
Indoor air monitoring report	Within 30 days of receipt of validated lab data
Periodic Review Report (PRR)	16 Months following the issuance of the COC, then Annually.

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

All interim monitoring/inspection 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 PRR will be prepared that addresses the Site described in **Appendix D** - Environmental Easement. The PRR will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The PRR will include:

- Identification, assessment, and certification of ECs/ICs required by the remedy for the Site.

- Results of the required annual Site inspections and severe condition inspections, if applicable.

- 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.

- A summary of 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, soil vapor, etc.), which include a listing of compounds analyzed, along with the applicable standards, with exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of analyses, copies of laboratory data sheets, and the required laboratory data deliverables for 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.
- Disposal manifest for purge water containerized in drums from groundwater monitoring events.
- A Site evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the site-specific RAWP and Decision Document;
    - The operation and the effectiveness of treatment and/or mitigation units, etc., including identification of needed repairs or modifications;
    - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
    - Recommendations regarding necessary changes to the remedy and/or Monitoring and Sampling Plan; and
    - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
    - The overall performance and effectiveness of the remedy.

- A performance summary for mitigation systems at the Site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - A description of breakdowns and/or repairs along with an explanation for significant downtime.
  - A description of the resolution of performance problems;
  - Alarm conditions;
  - Trends in equipment failure;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

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 PRR, the following certification as per the requirements of NYSDEC DER-10:

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

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any 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;*
- *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*
- *The information presented in this report is accurate and complete.*

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, Erik Dee-Olsen, of P.W. Grosser Consulting Engineer & Hydrogeologist, P.C., am certifying as Remedial Party's Designated Site Representative for the site.

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."

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 a 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.

7.4 Remedial System Optimization Report

A remedial site optimization (RSO) is an effort or action implemented to enhance and/or improve the effectiveness and cost-efficiently of the remediation.

In the event that an RSO is to be performed, an RSO report will be submitted to the Department for approval. The RSO report will document the research, investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs, etc., may still be required to implement the recommendations, based upon the actions that need to be taken. An update to the SMP may also be required. An outline of the requirements of an RSO is included in **Appendix J**.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the Site is located, and Site Control Section and to the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

C224395 - DRAFT August 2023 Final Engineering Report.

C224295 - June 2022 Remedial Action Work Plan

C224295 - June 2022 Decision Document

C224295 - March 2023 IRM Report

C224295 – June 2020 IRM Report

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

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

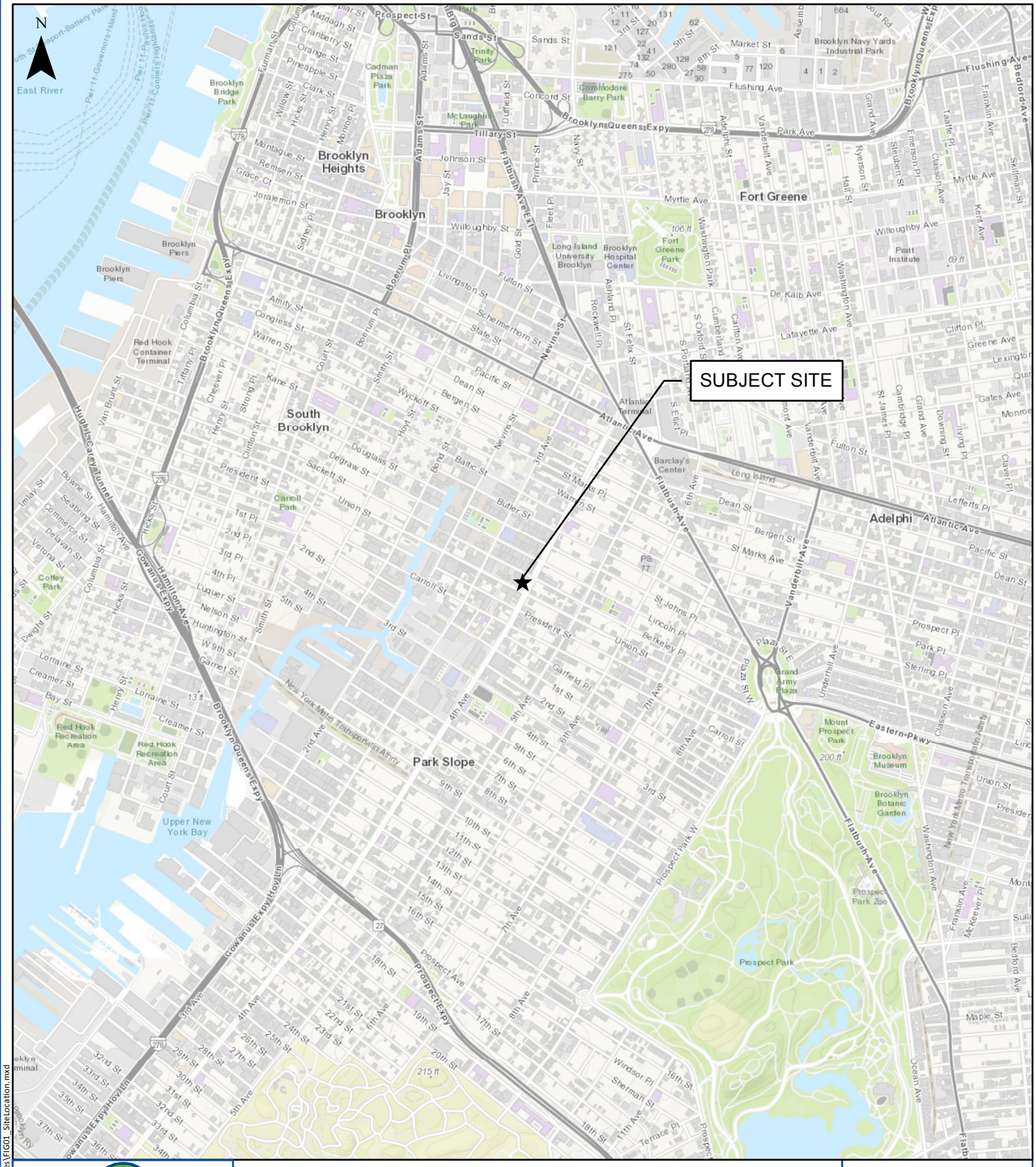
NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

February 2019 Phase I ESA

April 2019 Phase II ESA

Guidance for Evaluating Soil Vapor Intrusion in New York State, October 2006.

FIGURES



Vicinity Map

204 4th Avenue
Brooklyn, NY

0 ¼ ½ ¾ 1 Miles

PWGC
CLIENT DRIVEN SOLUTIONS
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Bohemia, NY 11716
Ph: 631-589-6353 • Fax: 631-589-8705
pwgc.info@pwgrosser.com

Project:	AHI2005
Date:	1/22/2020
Designed by:	RM
Drawn by:	WY
Approved by:	RM
Figure No:	1

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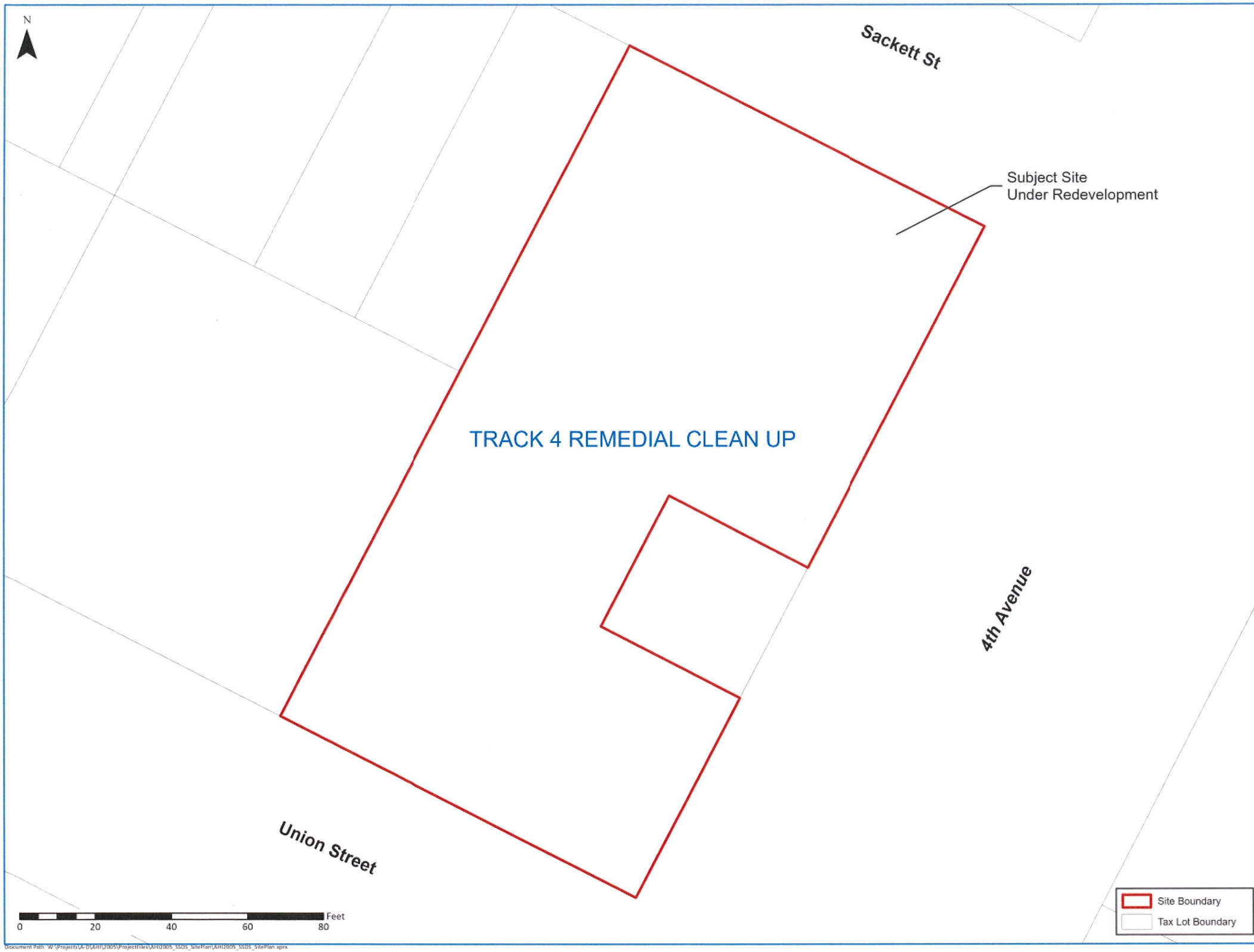

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STATE OF NEW YORK
ERIK JOSEPH DEE-OLSEN
088835
LICENSED PROFESSIONAL ENGINEER

DRAWING PREPARED FOR:

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

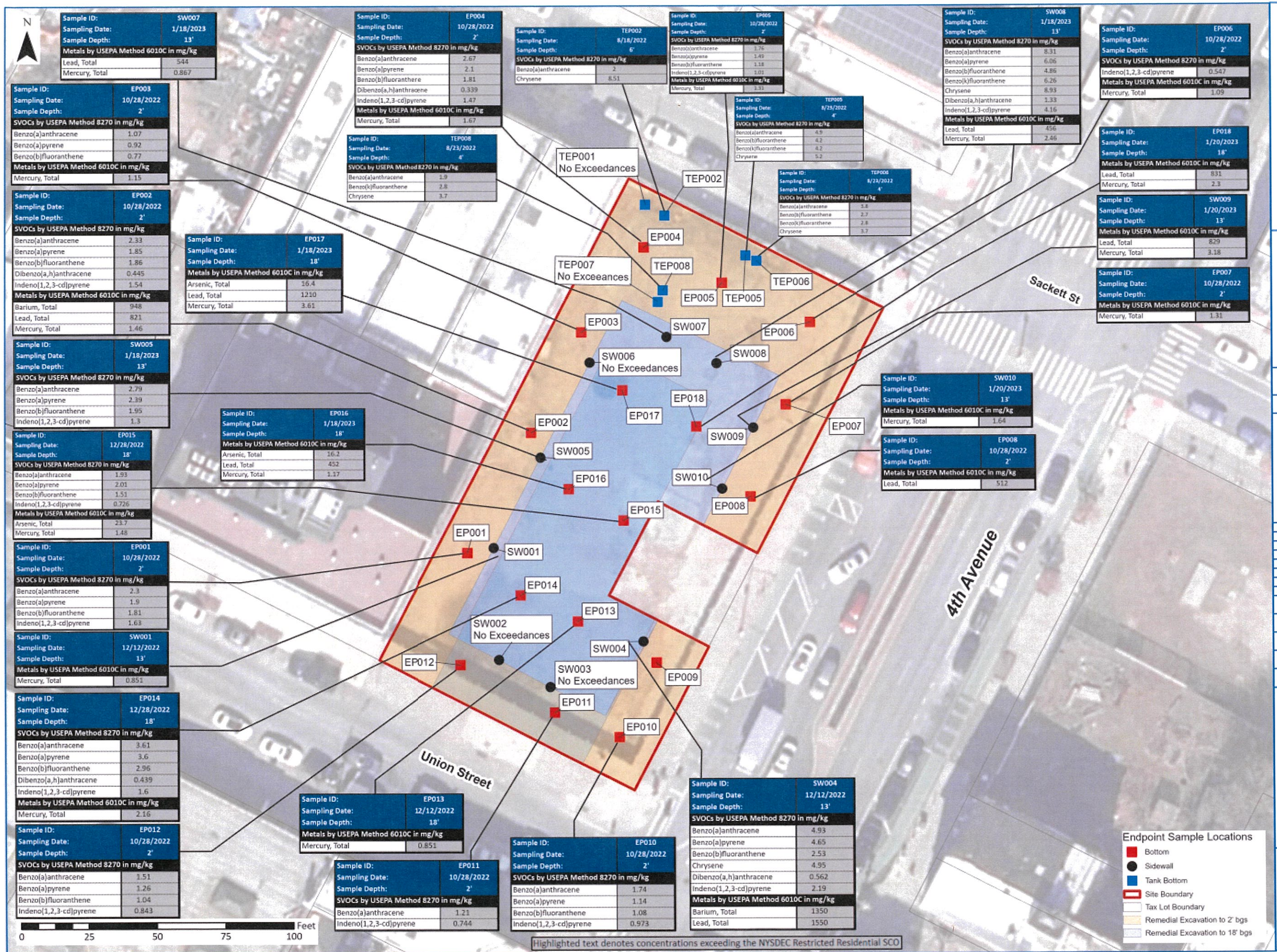
Project:	AHI2005	Designed by:	RM
Date:	12/7/2023	Drawn by:	KM
Scale:	AS SHOWN	Approved by:	RM

SITE PLAN

204 4th Avenue
Brooklyn, NY
(Block 434, Lot 36)

FIGURE NO:

2



Sample ID:	SW007
Sampling Date:	1/18/2023
Sample Depth:	13'
Metals by USEPA Method 6010C in mg/kg	
Lead, Total	544
Mercury, Total	0.867

Sample ID:	EP004
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	2.67
Benzo(a)pyrene	2.1
Benzo(b)fluoranthere	1.81
Dibenzo(a,h)anthracene	0.339
Indeno(1,2,3-cd)pyrene	1.47
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	1.67

Sample ID:	TEP002
Sampling Date:	8/18/2022
Sample Depth:	6'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	2
Chrysene	8.51

Sample ID:	EP005
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.76
Benzo(a)pyrene	1.49
Benzo(b)fluoranthene	1.18
Indeno(1,2,3-cd)pyrene	1.01
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	1.33

Sample ID:	SW008
Sampling Date:	1/18/2023
Sample Depth:	13'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	8.31
Benzo(a)pyrene	6.06
Benzo(b)fluoranthene	4.86
Benzo(k)fluoranthene	6.26
Chrysene	8.93
Dibenzo(a,h)anthracene	1.33
Indeno(1,2,3-cd)pyrene	4.16
Metals by USEPA Method 6010C in mg/kg	
Lead, Total	456
Mercury, Total	2.46

Sample ID:	EP006
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Indeno(1,2,3-cd)pyrene	0.547
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	1.09

Sample ID:	EP003
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.07
Benzo(a)pyrene	0.92
Benzo(b)fluoranthene	0.77
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	1.15

Sample ID:	TEP008
Sampling Date:	8/23/2022
Sample Depth:	4'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.9
Benzo(k)fluoranthene	2.8
Chrysene	3.7

Sample ID:	TEP005
Sampling Date:	8/23/2022
Sample Depth:	4'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	4.9
Benzo(b)fluoranthene	4.2
Benzo(k)fluoranthene	4.2
Chrysene	5.2

Sample ID:	TEP006
Sampling Date:	8/23/2022
Sample Depth:	4'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	5.8
Benzo(b)fluoranthene	2.7
Benzo(k)fluoranthene	2.8
Chrysene	3.7

Sample ID:	EP018
Sampling Date:	1/20/2023
Sample Depth:	18'
Metals by USEPA Method 6010C in mg/kg	
Lead, Total	831
Mercury, Total	2.3

Sample ID:	SW009
Sampling Date:	1/20/2023
Sample Depth:	13'
Metals by USEPA Method 6010C in mg/kg	
Lead, Total	829
Mercury, Total	3.18

Sample ID:	EP007
Sampling Date:	10/28/2022
Sample Depth:	2'
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	1.31

Sample ID:	EP017
Sampling Date:	1/18/2023
Sample Depth:	18'
Metals by USEPA Method 6010C in mg/kg	
Arsenic, Total	16.4
Lead, Total	1210
Mercury, Total	3.61

Sample ID:	EP002
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	2.33
Benzo(a)pyrene	1.85
Benzo(b)fluoranthene	1.86
Dibenzo(a,h)anthracene	0.445
Indeno(1,2,3-cd)pyrene	1.54
Metals by USEPA Method 6010C in mg/kg	
Barium, Total	948
Lead, Total	821
Mercury, Total	1.46

Sample ID:	SW005
Sampling Date:	1/18/2023
Sample Depth:	13'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	2.79
Benzo(a)pyrene	2.39
Benzo(b)fluoranthene	1.95
Indeno(1,2,3-cd)pyrene	1.3

Sample ID:	SW010
Sampling Date:	1/20/2023
Sample Depth:	13'
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	1.64

Sample ID:	EP008
Sampling Date:	10/28/2022
Sample Depth:	2'
Metals by USEPA Method 6010C in mg/kg	
Lead, Total	512

Sample ID:	EP016
Sampling Date:	1/18/2023
Sample Depth:	18'
Metals by USEPA Method 6010C in mg/kg	
Arsenic, Total	16.2
Lead, Total	452
Mercury, Total	1.17

Sample ID:	EP015
Sampling Date:	12/28/2022
Sample Depth:	18'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.93
Benzo(a)pyrene	2.01
Benzo(b)fluoranthene	1.51
Indeno(1,2,3-cd)pyrene	0.726
Metals by USEPA Method 6010C in mg/kg	
Arsenic, Total	23.7
Mercury, Total	1.48

Sample ID:	EP001
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	2.3
Benzo(a)pyrene	1.9
Benzo(b)fluoranthene	1.81
Indeno(1,2,3-cd)pyrene	1.63

Sample ID:	SW001
Sampling Date:	12/12/2022
Sample Depth:	13'
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	0.851

Sample ID:	EP014
Sampling Date:	12/28/2022
Sample Depth:	18'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	3.61
Benzo(a)pyrene	3.6
Benzo(b)fluoranthene	2.96
Dibenzo(a,h)anthracene	0.439
Indeno(1,2,3-cd)pyrene	1.6
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	2.16

Sample ID:	EP012
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.51
Benzo(a)pyrene	1.26
Benzo(b)fluoranthene	1.04
Indeno(1,2,3-cd)pyrene	0.843

Sample ID:	EP013
Sampling Date:	12/12/2022
Sample Depth:	18'
Metals by USEPA Method 6010C in mg/kg	
Mercury, Total	0.851

Sample ID:	EP011
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.21
Indeno(1,2,3-cd)pyrene	0.744

Sample ID:	EP010
Sampling Date:	10/28/2022
Sample Depth:	2'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	1.74
Benzo(a)pyrene	1.14
Benzo(b)fluoranthene	1.08
Indeno(1,2,3-cd)pyrene	0.973

Sample ID:	SW004
Sampling Date:	12/12/2022
Sample Depth:	13'
SVOCs by USEPA Method 8270 in mg/kg	
Benzo(a)anthracene	4.93
Benzo(a)pyrene	4.65
Benzo(b)fluoranthene	2.53
Chrysene	4.95
Dibenzo(a,h)anthracene	0.562
Indeno(1,2,3-cd)pyrene	2.19
Metals by USEPA Method 6010C in mg/kg	
Barium, Total	1350
Lead, Total	1550

Endpoint Sample Locations
- Bottom
- Sidewall
- Tank Bottom
- Site Boundary
- Tax Lot Boundary
- Remedial Excavation to 2' bgs
- Remedial Excavation to 18' bgs

Highlighted text denotes concentrations exceeding the NYSDEC Restricted Residential SCO

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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

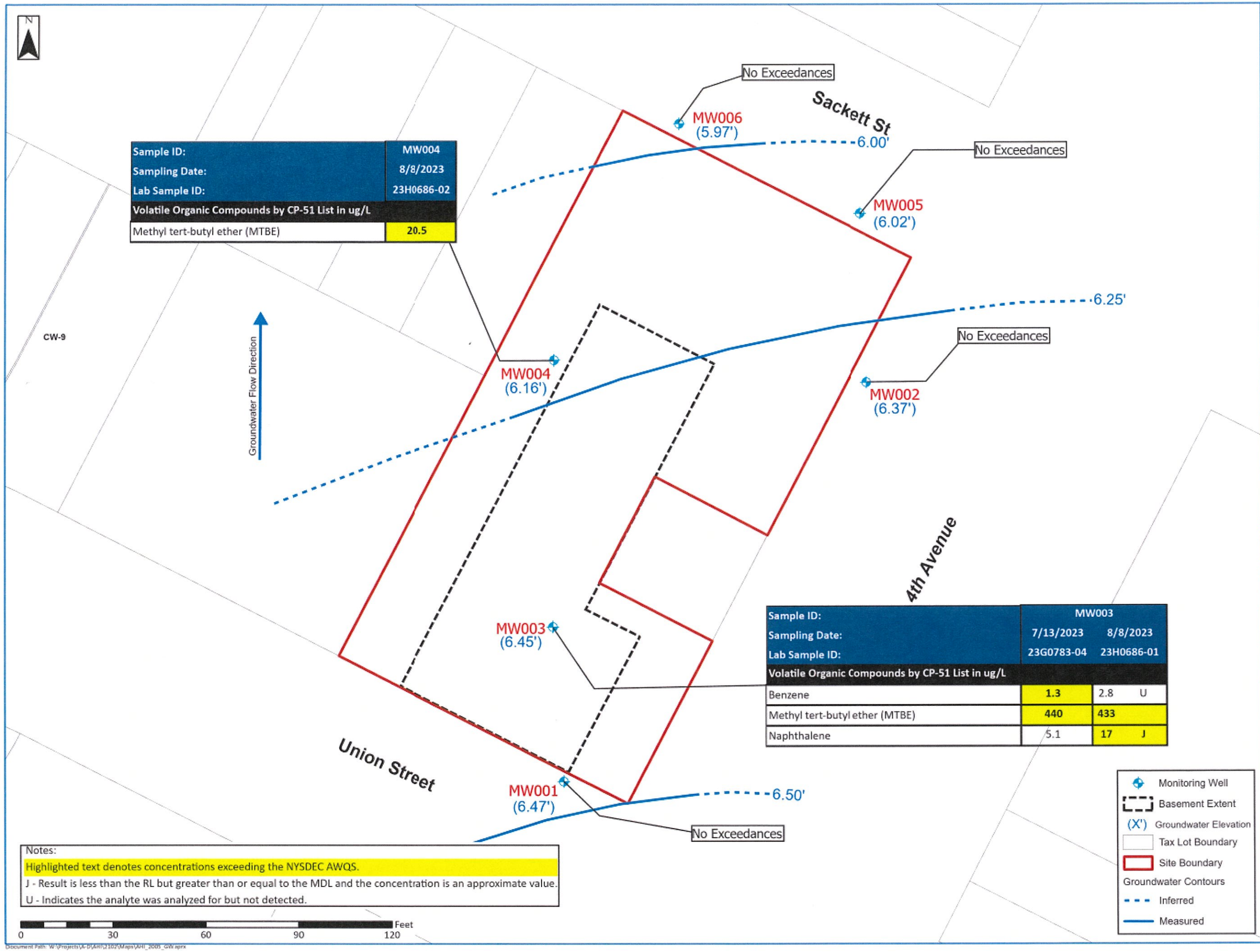
Project:	AHI2005	Designed by:	RM
Date:	12/7/2023	Drawn by:	KM
Scale:	AS SHOWN	Approved by:	RM

CONFIRMATORY ENDPOINT AND SIDEWALL SAMPLE ANALYTICAL EXCEEDANCES

204 4th Avenue
Brooklyn, NY

FIGURE NO:

5



Sample ID:	MW004
Sampling Date:	8/8/2023
Lab Sample ID:	23H0686-02
Volatile Organic Compounds by CP-51 List in ug/L	
Methyl tert-butyl ether (MTBE)	20.5

Sample ID:	MW003	
Sampling Date:	7/13/2023	8/8/2023
Lab Sample ID:	23G0783-04	23H0686-01
Volatile Organic Compounds by CP-51 List in ug/L		
Benzene	1.3	2.8 U
Methyl tert-butyl ether (MTBE)	440	433
Naphthalene	5.1	17 J

Notes:
Highlighted text denotes concentrations exceeding the NYSDEC AWQS.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.

0 30 60 90 120 Feet

Monitoring Well
Basement Extent
(X') Groundwater Elevation
Tax Lot Boundary
Site Boundary
Groundwater Contours
Inferred
Measured

Document Path: W:\Projects\A-D\AHI\21020\Maps\AHI_2005_GW.aprx

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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	AHI2005	Designed by:	RM
Date:	12/7/2023	Drawn by:	KM
Scale:	AS SHOWN	Approved by:	RM

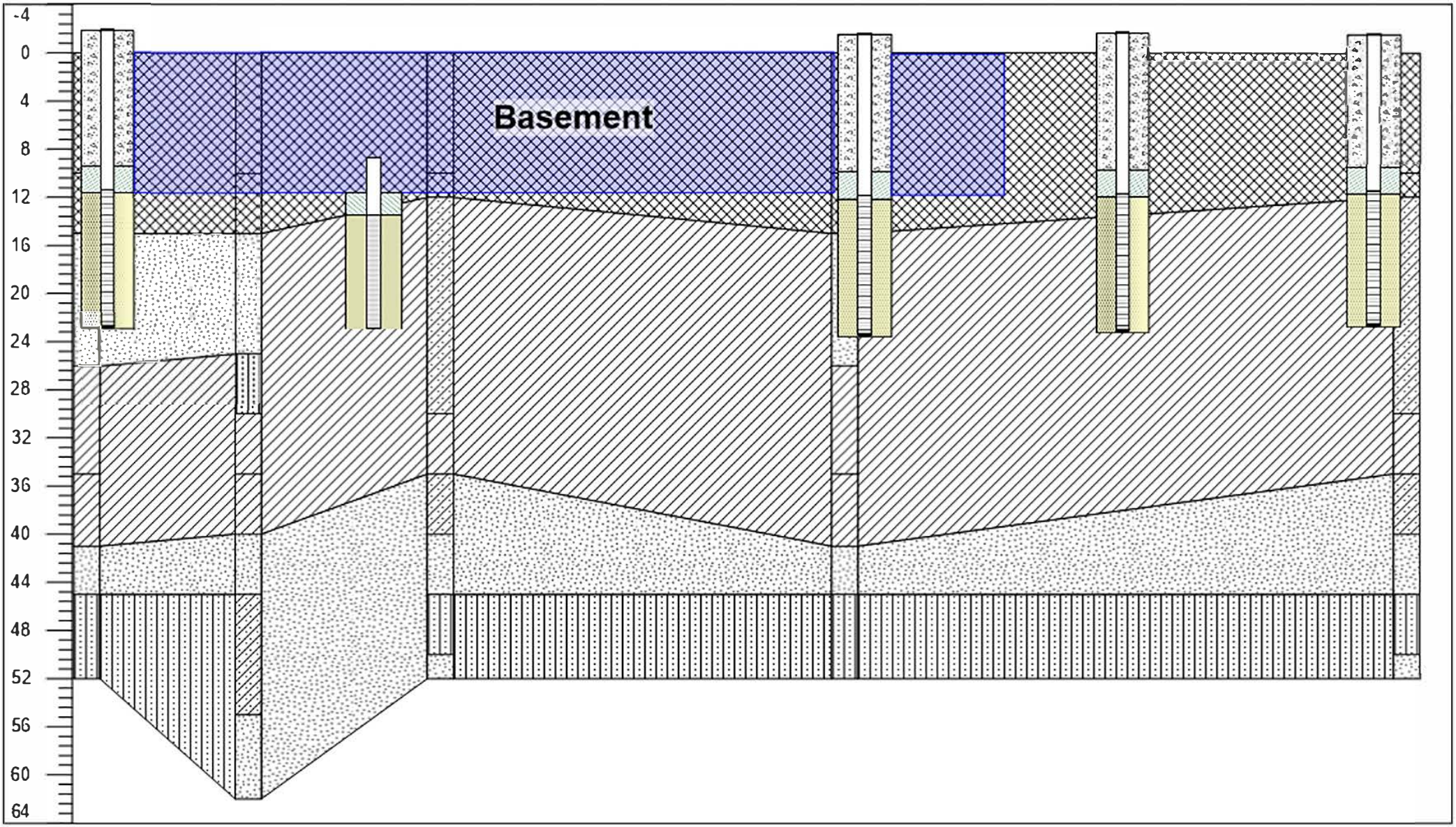
MONITORING WELL LOCATIONS WITH GROUNDWATER SAMPLE EXCEEDANCES AND GROUNDWATER ELEVATION CONTOURS

204 4th Avenue
Brooklyn, NY

FIGURE NO:

4

Geologic Cross Section with Well Locations



Legend

Fill	Slough	End Cap
Cement	Cover	Gravel Pack
Bentonite	Casing	Monument
Sand	Screen	

NOTES:
The depth of the each boring location is relative.

LOGGED BY:	Matthew Sanchez
DESIGNED BY:	Ryan Morley
APPROVED BY:	Ryan Morley
DATE :	11-17-2023

Cross Section 1

PWGC
CLIENT DRIVEN SOLUTIONS

Analyte 10/29/2021	SSVP-01
Method: TO-15 - VOCs - (µg/m3)	
1,2,4-Trimethylbenzene	10
1,3,5-Trimethylbenzene	2.86
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	1.44
4-Ethyltoluene	2.52
Acetone	32.1
Benzene	3.86
Bromodichloromethane	ND
Carbon Tetrachloride	0.48
Chloroform	ND
Cyclohexane	1.47
Dichlorodifluoromethane	3.01
Ethanol	65.5
Ethylbenzene	5.03
Heptane	2.76
Hexane	2.16
Isopropylalcohol	5.43
m,p-Xylene	18.5
Methyl Ethyl Ketone	6.54
o-Xylene	7.68
Tetrachloroethene	2.28
Tetrahydrofuran	15.9
Toluene	34.4
Trichlorofluoromethane	1.8
2,2,4-Trimethylpentane	ND

Analyte 10/29/2021	SVMP-01
Method: TO-15 - VOCs - (µg/m3)	
1,2,4-Trimethylbenzene	13.9
1,3,5-Trimethylbenzene	4.01
1,3-Dichlorobenzene	2.03
1,4-Dichlorobenzene	ND
4-Ethyltoluene	3.53
Acetone	41.5
Benzene	3.93
Bromodichloromethane	ND
Carbon Tetrachloride	0.25
Chloroform	32.2
Cyclohexane	1.83
Dichlorodifluoromethane	ND
Ethanol	32.8
Ethylbenzene	6.68
Heptane	3.35
Hexane	4.09
Isopropylalcohol	4.99
m,p-Xylene	25
Methyl Ethyl Ketone	8.87
o-Xylene	10.5
Tetrachloroethene	1.76
Tetrahydrofuran	19.1
Toluene	37.4
Trichlorofluoromethane	ND
2,2,4-Trimethylpentane	ND

Analyte 10/29/2021	SVMP-02
Method: TO-15 - VOCs - (µg/m3)	
1,2,4-Trimethylbenzene	7.71
1,3,5-Trimethylbenzene	2.28
1,3-Dichlorobenzene	1.78
1,4-Dichlorobenzene	ND
4-Ethyltoluene	2
Acetone	21
Benzene	1.82
Bromodichloromethane	2.6
Carbon Tetrachloride	0.28
Chloroform	80
Cyclohexane	ND
Dichlorodifluoromethane	ND
Ethanol	22
Ethylbenzene	3.71
Heptane	1.52
Hexane	1.08
Isopropylalcohol	3.24
m,p-Xylene	14.2
Methyl Ethyl Ketone	5.54
o-Xylene	6.03
Tetrachloroethene	1.04
Tetrahydrofuran	10.6
Toluene	16.7
Trichlorofluoromethane	ND
2,2,4-Trimethylpentane	ND

Analyte 10/29/2021	IA-01
Method: TO-15 - VOCs - (µg/m3)	
1,2,4-Trimethylbenzene	ND
1,3,5-Trimethylbenzene	3.16
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	1.2
4-Ethyltoluene	2.78
Acetone	38
Benzene	1.06
Bromodichloromethane	ND
Carbon Tetrachloride	0.75
Chloroform	ND
Cyclohexane	ND
Dichlorodifluoromethane	2.91
Ethanol	1,340
Ethylbenzene	5.51
Heptane	2.34
Hexane	1.64
Isopropylalcohol	58.7
m,p-Xylene	21.4
Methyl Ethyl Ketone	6.43
o-Xylene	8.59
Tetrachloroethene	3.57
Tetrahydrofuran	14.5
Toluene	28
Trichlorofluoromethane	1.6
2,2,4-Trimethylpentane	ND

Client Sample ID:	SV003	
Sample Depth (bgs):	10'	
Sampling Date:	2/22/2019	
Method: TO-15 - VOCs - (µg/m³)		
1,2,4-Trimethylbenzene	53.1	U
1,3-Butadiene	23.9	U
2-Butanone	79.3	U
Acetone	128	U
Benzene	34.5	U
Carbon disulfide	33.6	U
Chloroform	52.7	U
Cyclohexane	375	
Dichlorodifluoromethane	53.4	U
Ethanol	507	U
Ethylbenzene	46.9	U
Heptane	44.3	U
Isopropanol	165	
n-Hexane	214	
o-Xylene	46.9	U
p/m-Xylene	93.8	U
Tertiary butyl Alcohol	81.5	U
Toluene	40.7	U
Trichlorofluoromethane	60.7	U
2,2,4-Trimethylpentane	12100	

Client Sample ID:	SV004	
Sample Depth (bgs):	10'	
Sampling Date:	2/22/2019	
Method: TO-15 - VOCs - (µg/m³)		
1,2,4-Trimethylbenzene	3.22	U
1,3-Butadiene	1.45	U
2-Butanone	4.84	U
Acetone	57	
Benzene	11.9	
Carbon disulfide	2.22	
Chloroform	3.2	U
Cyclohexane	47.2	
Dichlorodifluoromethane	3.24	U
Ethanol	30.9	U
Ethylbenzene	2.85	U
Heptane	41.4	
Isopropanol	150	
n-Hexane	223	
o-Xylene	2.85	U
p/m-Xylene	5.69	U
Tertiary butyl Alcohol	4.97	U
Toluene	12.7	
Trichlorofluoromethane	3.69	U
2,2,4-Trimethylpentane	1010	

Client Sample ID:	SV005	
Sample Depth (bgs):	10'	
Sampling Date:	2/22/2019	
Method: TO-15 - VOCs - (µg/m³)		
1,2,4-Trimethylbenzene	1.21	
1,3-Butadiene	0.47	
2-Butanone	2.51	
Acetone	25.2	
Benzene	3.99	
Carbon disulfide	0.807	
Chloroform	0.977	U
Cyclohexane	1.68	
Dichlorodifluoromethane	2.11	
Ethanol	41.1	
Ethylbenzene	1.14	
Heptane	2.8	
Isopropanol	79.4	
n-Hexane	7.68	
o-Xylene	1.33	
p/m-Xylene	3.71	
Tertiary butyl Alcohol	6.12	
Toluene	9.99	
Trichlorofluoromethane	7.19	
2,2,4-Trimethylpentane	12.4	

Client Sample ID:	SV001	
Sample Depth (bgs):	10'	
Sampling Date:	2/22/2019	
Method: TO-15 - VOCs - (µg/m³)		
1,2,4-Trimethylbenzene	2.210	
1,3-Butadiene	0.442	U
2-Butanone	2.21	
Acetone	24.5	
Benzene	10.6	
Carbon disulfide	0.766	
Chloroform	1.39	
Cyclohexane	1.1	
Dichlorodifluoromethane	1.86	
Ethanol	26	
Ethylbenzene	1.29	
Heptane	2.47	
Isopropanol	197	
n-Hexane	3.7	
o-Xylene	1.51	
p/m-Xylene	4.21	
Tertiary butyl Alcohol	19.2	
Toluene	9.87	
Trichlorofluoromethane	1.12	U
2,2,4-Trimethylpentane	2.62	

Client Sample ID:	SV002	
Sample Depth (bgs):	10'	
Sampling Date:	2/22/2019	
Method: TO-15 - VOCs - (µg/m³)		
1,2,4-Trimethylbenzene	4.92	U
1,3-Butadiene	2.21	U
2-Butanone	7.4	U
Acetone	22.5	
Benzene	21.3	
Carbon disulfide	3.11	U
Chloroform	10.5	
Cyclohexane	84.3	
Dichlorodifluoromethane	4.94	U
Ethanol	47	U
Ethylbenzene	4.34	U
Heptane	185	
Isopropanol	127	
n-Hexane	529	
o-Xylene	4.34	U
p/m-Xylene	8.73	U
Tertiary butyl Alcohol	11.3	
Toluene	27.1	
Trichlorofluoromethane	5.62	U
2,2,4-Trimethylpentane	2010	

Client Sample ID:	SV006	
Sample Depth (bgs):	10'	
Sampling Date:	2/22/2019	
Method: TO-15 - VOCs - (µg/m³)		
1,2,4-Trimethylbenzene	1,760	U
1,3-Butadiene	790	U
2-Butanone	2,630	U
Acetone	4,250	U
Benzene	1,140	U
Carbon disulfide	1,110	U
Chloroform	1,740	U
Cyclohexane	1,230	U
Dichlorodifluoromethane	1,770	U
Ethanol	16,800	U
Ethylbenzene	1,550	U
Heptane	1,460	U
Isopropanol	2,200	U
n-Hexane	1,260	U
o-Xylene	1,550	U
p/m-Xylene	3,100	U
Tertiary butyl Alcohol	2,710	U
Toluene	1,350	U
Trichlorofluoromethane	2,010	U
2,2,4-Trimethylpentane	509000	

Soil Vapor Monitoring Point
Indoor Air Sampling Location
Subslab Vapor Sampling Location Collected at 2-inches BGS
Soil Vapor Sampling Location
Tax Lot Boundary
Site Boundary

Document Path: W:\Projects\A-D\AHI\2005\ProjectFiles\AHI2005_RAWP\AHI2005_RAWP.aprx

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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

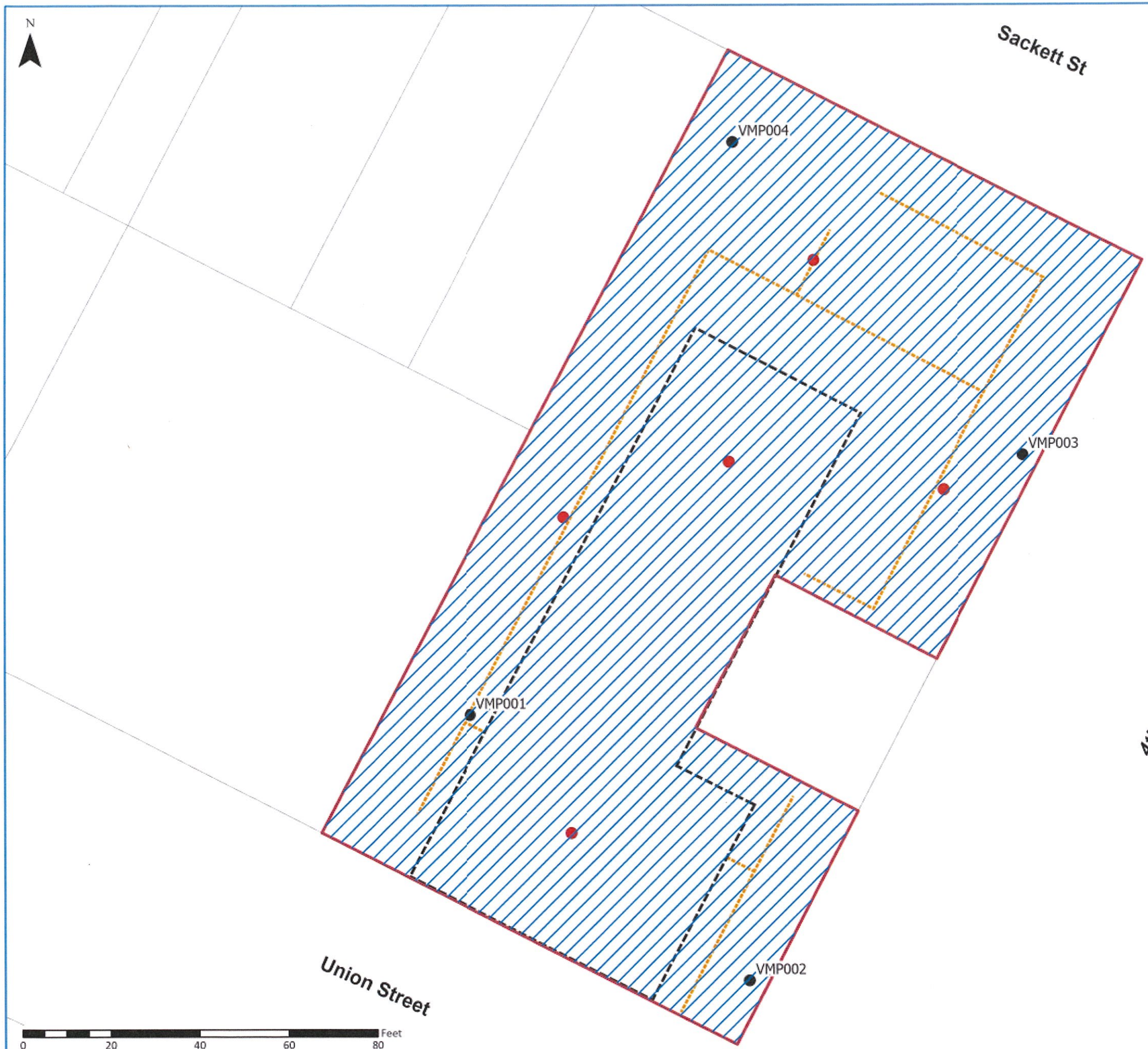
Project:	AHI2005	Designed by:	RM
Date:	12/7/2023	Drawn by:	KM
Scale:	AS SHOWN	Approved by:	RM

SOIL VAPOR SAMPLING ANALYTICAL RESULTS FROM PREVIOUS INVESTIGATIONS

204 4th Avenue
Brooklyn, NY

FIGURE NO:

6



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Date:	12/7/2023	Drawn by:	PH
Scale:	AS SHOWN	Approved by:	RM

ENGINEERING CONTROLS LOCATIONS - COVER SYSTEM EXTENT w/SSDS PIPING

204 4th Avenue
Brooklyn, NY

FIGURE NO:

7

TABLES

Table 1
UST Removal Endpoint Sample Analytical Data - VOCs and SVOCs
204 4th Avenue, Brooklyn, New York

Sample ID: / Tank Area / Sampling Date: / Sampling Depth: / Lab Sample ID:	NYSDEC Protection of Groundwater SCOs[1]	TEP001 UST001 8/18/2022 6' 22H1142-01		TEP002 UST001 8/18/2022 6' 22H1142-03		TEP005 UST002 8/23/2022 4' 22H1437-01		TEP006 UST002 8/23/2022 4' 22H1437-02		TEP007 UST003 8/23/2022 4' 22H1437-03		TEP008 UST003 8/23/2022 4' 22H1437-04	
Volatile Organic Compounds by CP-51 List in mg/kg													
1,2,4-Trimethylbenzene	3.6	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
1,3,5-Trimethylbenzene	8.4	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Benzene	0.06	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Ethyl Benzene	1	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Isopropylbenzene	2.3	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Methyl tert-butyl ether (MTBE)	0.93	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Naphthalene	12	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
n-Butylbenzene	12	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
n-Propylbenzene	3.9	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
o-Xylene	~	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
p- & m- Xylenes	~	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
p-Isopropyltoluene	10	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
sec-Butylbenzene	11	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
tert-Butylbenzene	5.9	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Toluene	0.7	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Xylenes, Total	0.26	0.0016	U	0.0015	U	0.0015	U	0.0017	U	0.0016	U	0.0015	U
Semivolatile Organic Compounds by CP-51 List in mg/kg													
Acenaphthene	98	0.0550	J	0.17		0.93		0.69		0.052	J	0.25	
Acenaphthylene	107	0.0570	J	0.18		0.57		0.27	J	0.083	J	0.2	
Anthracene	1000	0.170		0.72		12		1.9		0.22		0.81	
Benzo(a)anthracene	1	0.500		2		4.9		3.8		0.71		1.9	
Benzo(a)pyrene	22	0.520		2		5		3.3		0.7		1.9	
Benzo(b)fluoranthene	1.7	0.460		1.6		4.2		2.7		0.61		1.7	
Benzo(g,h,i)perylene	1000	0.400		1.3		3.1		2		0.44		1.3	
Benzo(k)fluoranthene	1.7	0.440		1.6		4.2		2.8		0.6		1.6	
Chrysene	1	0.530		2		5.2		3.7		0.75		2	
Dibenzo(a,h)anthracene	1000	0.120		0.4		1.2		0.48	J	0.081	J	0.46	
Fluoranthene	1000	1.200		4.1		12		9.3		1.3		2.3	
Fluorene	386	0.0440	U	0.18		1.1		0.47	J	0.046	U	0.24	
Indeno(1,2,3-cd)pyrene	8.2	0.410		1.1		3.7		2.3		0.56		1.4	
Naphthalene	12	0.0440	U	0.068	J	1.1		0.26	U	0.046	U	0.11	
Phenanthrene	1000	0.770		2.5		11		8.2		0.82		2.9	
Pyrene	1000	0.980		3.4		10		8.7		1.2		3.9	

Notes:
[1] New York DEC Part 375 Soil Cleanup Objectives - Protection of Groundwater - dated October 21, 2010.
** - Volatile Organics by EPA 5035
* - Volatile Organics by EPA 5035 High
NA- Not Analyzed
NS- No Standard
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
Highlighted text denotes concentrations exceeding the NYSDEC Protection of Groundwater Soil Cleanup Objecives.

Table 2
Remedial Endpoint Sample Analytical Data - SVOCs
204 4th Avenue, Brooklyn, NY

Sample ID:	NYSDEC Soil Cleanup Objectives - Protection of Groundwater[(1)]	EP001	EP002	EP003	EP004	EP005	EP006	EP007	EP008	EP009	EP010
Sampling Date:		10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022
Lab Sample ID:		22J1513-01	22J1513-02	22J1513-03	22J1513-04	22J1513-05	22J1513-06	22J1513-07	22J1513-08	22J1513-09	22J1513-10
Sample Depth:		2'	2'	2'	2'	2'	2'	2'	2'	2'	2'
Volatile Organic Compounds by USEPA Method 8260 in mg/kg											
1,1,1,2-Tetrachloroethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1,1-Trichloroethane	0.68	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1,2,2-Tetrachloroethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1,2-Trichloroethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1-Dichloroethane	0.27	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1-Dichloroethene	0.33	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,1-Dichloropropene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2,3-Trichlorobenzene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2,3-Trichloropropane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2,4-Trichlorobenzene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2,4-Trimethylbenzene	3.6	0.0025 U	0.0041 U	0.0057	0.0025 U	0.0032 J	0.017	0.011 J	0.097	0.2	0.013
1,2-Dibromo-3-chloropropane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2-Dibromoethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2-Dichlorobenzene	1.1	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2-Dichloroethane	0.02	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,2-Dichloropropane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,3,5-Trimethylbenzene	8.4	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0036 J	0.0069 U	0.024	0.047	0.0033 J
1,3-Dichlorobenzene	2.4	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,3-Dichloropropane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,4-Dichlorobenzene	1.8	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
1,4-Dioxane	0.1	0.05 U	0.081 U	0.049 U	0.049 U	0.05 U	0.066 U	0.14 U	0.092 U	0.089 U	0.066 U
2,2-Dichloropropane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
2-Butanone	0.12	0.011	0.0041 U	0.012	0.013	0.014	0.023	0.045	0.012	0.03	0.0063 J
2-Chlorotoluene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
2-Hexanone	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
4-Chlorotoluene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
4-Methyl-2-pentanone	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Acetone	0.05	0.12	0.16	0.1	0.11	0.11	0.16	0.46	0.088	0.28	0.045
Acrolein	NS	0.005 U	0.0081 U	0.0049 U	0.0049 U	0.005 U	0.0066 U	0.014 U	0.0092 U	0.0089 U	0.0066 U
Acrylonitrile	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Benzene	0.06	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Bromobenzene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Bromochloromethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Bromodichloromethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Bromoform	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Bromomethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Carbon disulfide	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0055 J	0.0044 U	0.0033 U
Carbon tetrachloride	0.76	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Chlorobenzene	1.1	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Chloroethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Chloroform	0.37	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Chloromethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
cis-1,2-Dichloroethene	0.25	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
cis-1,3-Dichloropropene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Cyclohexane	NS	0.0025 U	0.0046 J	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Dibromochloromethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Dibromomethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Dichlorodifluoromethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Ethylbenzene	1	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.013	0.0033 U
Hexachlorobutadiene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Isopropylbenzene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0048 J	0.01	0.0033 U
Methyl acetate	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Methyl tert butyl ether	0.93	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Methylcyclohexane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Methylene chloride	0.05	0.005 U	0.0081 U	0.0049 U	0.0049 U	0.005 U	0.0066 U	0.014 U	0.0092 U	0.0089 U	0.0066 U
n-Butylbenzene	12	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.015	0.016	0.0033 U
n-Propylbenzene	3.9	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 J	0.0069 U	0.015	0.036	0.0036 J
o-Xylene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0048 J	0.011	0.0033 U
p-Isopropyltoluene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
p/m-Xylene	NS	0.005 U	0.0081 U	0.0049 U	0.0049 U	0.005 U	0.0068 J	0.014 U	0.0092 U	0.037	0.0066 U
sec-Butylbenzene	11	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0053 J	0.0033 U
Styrene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
tert-Butyl alcohol (TBA)	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
tert-Butylbenzene	5.9	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Tetrachloroethene	1.3	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Toluene	0.7	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
trans-1,2-Dichloroethene	0.19	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
trans-1,3-Dichloropropene	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Trichloroethene	0.47	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Trichlorofluoromethane	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Vinyl acetate	NS	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Vinyl chloride	0.02	0.0025 U	0.0041 U	0.0024 U	0.0025 U	0.0025 U	0.0033 U	0.0069 U	0.0046 U	0.0044 U	0.0033 U
Xylenes, Total	1.6	0.0074 U	0.012 U	0.0073 U	0.0074 U	0.0076 U	0.01 U	0.021 U	0.014 U	0.048	0.01 U

Sample ID:	EP011	EP012	DUP	EP013	SW001	SW002	SW003	SW004	EP014	EP015
Sampling Date:	10/28/2022	10/28/2022	10/28/2022	12/12/2022	12/12/2022	12/12/2022	12/12/2022	12/12/2022	12/28/2022	12/28/2022
Lab Sample ID:	22J1513-11	22J1513-12	22J1513-13	22L1279-01	22L1279-02	22L1279-03	22L1279-04	22L1279-05	22L1385-01	22L1385-02
Sample Depth:	2'	2'	NA	18'	13'	13'	13'	13'	18'	18'
Volatile Organic Compounds by USEPA Method 8260 in mg/kg										
1,1,1,2-Tetrachloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1,1-Trichloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1,2,2-Tetrachloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1,2-Trichloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1-Dichloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1-Dichloroethene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,1-Dichloropropene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2,3-Trichlorobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2,3-Trichloropropane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2,4-Trichlorobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2,4-Trimethylbenzene	0.0059 J	0.0066 J	0.13	0.0047 U	0.0034 J	0.019	0.0027 U	0.0034 U	0.025	0.18
1,2-Dibromo-3-chloropropane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2-Dibromoethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2-Dichlorobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2-Dichloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,2-Dichloropropane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,3,5-Trimethylbenzene	0.0035 U	0.0038 U	0.031	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0054 J	0.044
1,3-Dichlorobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,3-Dichloropropane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,4-Dichlorobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
1,4-Dioxane	0.07 U	0.077 U	0.054 U	0.094 U	0.047 U	0.06 U	0.054 U	0.068 U	0.07 U	0.11 U
2,2-Dichloropropane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
2-Butanone	0.0086	0.015	0.011	0.11	0.0031 J	0.0073	0.0067	0.0034 U	0.0068 J	0.0093 J
2-Chlorotoluene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
2-Hexanone	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
4-Chlorotoluene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
4-Methyl-2-pentanone	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Acetone	0.068	0.096	0.2	0.33	0.027	0.042	0.037	0.025	0.04	0.055
Acrolein	0.007 U	0.0077 U	0.0054 U	0.0094 U	0.0047 U	0.006 U	0.0054 U	0.0068 U	0.007 U	0.011 U
Acrylonitrile	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Benzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.01 J
Bromobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Bromochloromethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Bromodichloromethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Bromoform	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Bromomethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Carbon disulfide	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Carbon tetrachloride	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Chlorobenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Chloroethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Chloroform	0.0035 U	0.0038 U	0.0027 U	0.0048 J	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Chloromethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
cis-1,2-Dichloroethene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
cis-1,3-Dichloropropene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Cyclohexane	0.0035 U	0.0038 U	0.0027 U	0.024	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.03
Dibromochloromethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Dibromomethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Dichlorodifluoromethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Ethylbenzene	0.0035 U	0.0038 U	0.012	0.0047 U	0.0024 U	0.015	0.0027 U	0.0034 U	0.0071	0.096
Hexachlorobutadiene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Isopropylbenzene	0.0035 U	0.0038 U	0.0089	0.0047 U	0.0024 U	0.0045 J	0.0027 U	0.0034 U	0.0091	0.025
Methyl acetate	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Methyl tert butyl ether	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.005 J	0.013
Methylcyclohexane	0.0035 U	0.0038 U	0.0073	0.02	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.031
Methylene chloride	0.007 U	0.0077 U	0.0054 U	0.0094 U	0.0047 U	0.006 U	0.0054 U	0.0068 U	0.007 U	0.011 U
n-Butylbenzene	0.0035 U	0.0038 U	0.012	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0071 J
n-Propylbenzene	0.0045 J	0.0038 U	0.031	0.0047 U	0.0024 U	0.013	0.0027 U	0.0034 U	0.014	0.045
o-Xylene	0.0035 U	0.0038 U	0.0079	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0056 J	0.028
p-Isopropyltoluene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
p/m-Xylene	0.007 U	0.0077 U	0.032	0.0094 U	0.0047 U	0.006 U	0.0054 U	0.0068 U	0.012 J	0.15
sec-Butylbenzene	0.0035 U	0.0038 U	0.0049 J	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0053 J	0.0055 U
Styrene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
tert-Butyl alcohol (TBA)	0.0035 U	0.0038 U	0.0027 U	0.057	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.044	0.059
tert-Butylbenzene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Tetrachloroethene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Toluene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0062 J	0.011
trans-1,2-Dichloroethene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
trans-1,3-Dichloropropene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Trichloroethene	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Trichlorofluoromethane	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Vinyl acetate	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Vinyl chloride	0.0035 U	0.0038 U	0.0027 U	0.0047 U	0.0024 U	0.003 U	0.0027 U	0.0034 U	0.0035 U	0.0055 U
Xylenes, Total	0.01 U	0.012 U	0.04	0.014 U	0.0071 U	0.009 U	0.0082 U	0.01 U	0.018 J	0.18

Sample ID:	EP016	EP017	SW005	SW006	SW007	SW008	DUP	EP018	SW009	SW010
Sampling Date:	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/20/2023	1/20/2023	1/20/2023
Lab Sample ID:	23A0851-01	23A0851-02	23A0851-03	23A0851-04	23A0851-05	23A0851-06	23A0851-07	23A1047-01	23A1047-02	23A1047-03
Sample Depth:	18'	18'	13'	13'	13'	13'	NA	18'	13'	13'
Volatile Organic Compounds by USEPA Method 8260 in mg/kg										
1,1,1,2-Tetrachloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1,1-Trichloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1,2,2-Tetrachloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1,2-Trichloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1-Dichloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1-Dichloroethene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,1-Dichloropropene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2,3-Trichlorobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2,3-Trichloropropane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2,4-Trichlorobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2,4-Trimethylbenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0093 J
1,2-Dibromo-3-chloropropane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2-Dibromoethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2-Dichlorobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2-Dichloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,2-Dichloropropane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,3,5-Trimethylbenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.15	0.093	0.15
1,3-Dichlorobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,3-Dichloropropane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,4-Dichlorobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
1,4-Dioxane	0.12 U	0.12 U	0.059 U	0.1 U	0.062 U	0.049 U	0.056 U	0.26 U	0.17 U	0.17 U
2,2-Dichloropropane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
2-Butanone	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.022 J	0.021	0.0086 U
2-Chlorotoluene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
2-Hexanone	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
4-Chlorotoluene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
4-Methyl-2-pentanone	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.017 J	0.0083 U	0.0086 U
Acetone	0.013 J	0.072	0.04	0.01 U	0.027	0.0082 J	0.02	0.13	0.1	0.028 J
Acrolein	0.012 U	0.012 U	0.0059 U	0.01 U	0.0062 U	0.0049 U	0.0056 U	0.026 U	0.017 U	0.017 U
Acrylonitrile	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Benzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Bromobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Bromochloromethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Bromodichloromethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Bromoform	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Bromomethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Carbon disulfide	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Carbon tetrachloride	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Chlorobenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Chloroethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Chloroform	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Chloromethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
cis-1,2-Dichloroethene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
cis-1,3-Dichloropropene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Cyclohexane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.022 J	0.022	0.053
Dibromochloromethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Dibromomethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Dichlorodifluoromethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Ethylbenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Hexachlorobutadiene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Isopropylbenzene	0.006 U	0.0059 U	0.0051 J	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Methyl acetate	0.006 U	0.0059 U	0.0034 J	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.015 J
Methyl tert butyl ether	0.006 U	0.0059 U	0.0029 U	0.0078 J	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Methylcyclohexane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.038	0.034	0.11
Methylene chloride	0.012 U	0.012 U	0.0059 U	0.01 U	0.0062 U	0.0049 U	0.0056 U	0.026 U	0.017 U	0.017 U
n-Butylbenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.019 J	0.011 J	0.021
n-Propylbenzene	0.006 U	0.0059 U	0.0055 J	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
o-Xylene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.071	0.054	0.05
p-Isopropyltoluene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
p/m-Xylene	0.012 U	0.012 U	0.0059 U	0.01 U	0.0062 U	0.0049 U	0.0056 U	0.026 U	0.017 U	0.017 U
sec-Butylbenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Styrene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
tert-Butyl alcohol (TBA)	0.006 U	0.11	0.0029 U	0.0051 U	0.0054 J	0.0024 U	0.0028 U	0.067	0.051	0.052
tert-Butylbenzene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Tetrachloroethene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Toluene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.016 J	0.0086 U
trans-1,2-Dichloroethene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
trans-1,3-Dichloropropene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Trichloroethene	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Trichlorofluoromethane	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Vinyl acetate	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Vinyl chloride	0.006 U	0.0059 U	0.0029 U	0.0051 U	0.0031 U	0.0024 U	0.0028 U	0.013 U	0.0083 U	0.0086 U
Xylenes, Total	0.018 U	0.018 U	0.0088 U	0.015 U	0.0092 U	0.0073 U	0.0084 U	0.088	0.063	0.062

Notes:
[(1)] NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a 12/06
** - Volatile Organics by EPA 5035
* - Volatile Organics by EPA 5035 High
NA- Not Analyzed
NS- No Standard
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
Highlighted text denotes concentrations exceeding the NYSDEC Protection of Groundwater SCO

Table 3
Remedial Endpoint Sample Analytical Data - SVOCs
204 4th Avenue, Brooklyn, NY

Sample ID:	NYSDEC Soil Cleanup Objectives - Restricted Residential Use[2]	EP001	EP002	EP003	EP004	EP005	EP006	EP007	EP008	EP009	EP010
Sampling Date:		10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022	10/28/2022
Lab Sample ID:		22J1513-01	22J1513-02	22J1513-03	22J1513-04	22J1513-05	22J1513-06	22J1513-07	22J1513-08	22J1513-09	22J1513-10
Sample Depth:		2'	2'	2'	2'	2'	2'	2'	2'	2'	2'
Semivolatile Organic Compounds by USEPA Method 8270 in mg/kg											
1,1-Biphenyl	NS	0.0489 U	0.0516 U	0.0478 U	0.0541 J	0.0652 J	0.0878	0.0487 J	0.0468 U	0.0502 U	0.0517 J
1,2,4,5-Tetrachlorobenzene	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
1,2,4-Trichlorobenzene	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
1,2-Dichlorobenzene	100	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
1,2-Diphenylhydrazine (as Azobenzene)	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
1,3-Dichlorobenzene	49	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
1,4-Dichlorobenzene	13	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2,3,4,6-Tetrachlorophenol	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
2,4,5-Trichlorophenol	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2,4,6-Trichlorophenol	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2,4-Dichlorophenol	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2,4-Dimethylphenol	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2,4-Dinitrophenol	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
2,4-Dinitrotoluene	NS	0.0489 U	0.0516 U	1.11	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2,6-Dinitrotoluene	NS	0.0489 U	0.0516 U	1.53	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2-Chloronaphthalene	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2-Chlorophenol	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2-Methylnaphthalene	NS	0.0647 J	0.0516 U	0.152	0.186	0.218	0.437	0.162	0.0468 U	0.101	0.173
2-Methylphenol	100	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
2-Nitroaniline	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
2-Nitrophenol	NS	0.0489 U	0.0516 U	0.0809 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
3,3'-Dichlorobenzidine	100	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
3- & 4-Methylphenols	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
3-Nitroaniline	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
4,6-Dinitro-o-cresol	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
4-Bromophenyl phenyl ether	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
4-Chloroaniline	NS	0.0489 U	0.0516 U	0.0587 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
4-Chlorophenyl phenyl ether	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
4-Nitroaniline	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
4-Nitrophenol	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
Acenaphthene	100	0.177	0.2	0.349	0.482	0.419	0.716	0.342	0.0724 J	0.161	0.432
Acenaphthylene	100	0.208	0.169	0.114	0.121	0.156	0.0729 J	0.0781 J	0.0468 U	0.0502 U	0.065 J
Acetophenone	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Aniline	NS	0.195 U	0.206 U	0.191 U	0.194 U	0.167 U	0.196 U	0.194 U	0.1870 U	0.201 U	0.196 U
Anthracene	100	0.784	0.78	1.92	1.24	0.925	0.793	0.417	0.150	0.293	0.872
Atrazine	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Benzaldehyde	NS	0.0489 U	0.0568 J	0.0503 J	0.0549 J	0.0553 J	0.133	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Benzidine	NS	0.195 U	0.206 U	0.191 U	0.194 U	0.167 U	0.196 U	0.194 U	0.1870 U	0.201 U	0.196 U
Benzo(a)anthracene	1	2.3	2.33	1.07	2.67	1.76	0.987	0.836	0.518	0.681	1.74
Benzo(a)pyrene	1	1.9	1.85	0.92	2.1	1.49	0.745	0.621	0.3810	0.428	1.14
Benzo(b)fluoranthene	1	1.81	1.86	0.77	1.81	1.18	0.677	0.567	0.3500	0.42	1.08
Benzo(ghi)perylene	100	1.34	1.2	0.477	1.1	0.784	0.433	0.374	0.3040	0.318	0.776
Benzo(k)fluoranthene	3.9	1.34	1.42	0.831	1.51	1.12	0.538	0.451	0.3070	0.386	0.875
Benzoic Acid	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Benzyl Alcohol	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Bis(2-chloroethoxy)methane	NS	0.0489 U	0.0516 U	0.192	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Bis(2-chloroethyl)ether	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Bis(2-chloroisopropyl)ether	NS	0.0489 U	0.0516 U	0.0481 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Bis(2-ethylhexyl)phthalate	NS	2.02	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0776 J	0.0502 U	0.0491 U
Butyl benzyl phthalate	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Caprolactam	NS	0.0975 U	0.103 U	0.0954 U	0.0968 U	0.0833 U	0.098 U	0.0967 U	0.0934 U	0.1 U	0.098 U
Carbazole	NS	0.31	0.365	0.159	0.391	0.329	0.255	0.142	0.0522 J	0.0961 J	0.394
Chrysene	3.9	2.26	2.24	1.08	2.45	1.68	0.898	0.716	0.4340	0.553	1.39
Di-n-butylphthalate	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Di-n-octylphthalate	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Dibenzo(a,h)anthracene	0.33	0.309	0.445	0.172	0.339	0.236	0.107	0.11	0.0604 J	0.0502 U	0.0491 U
Dibenzofuran	59	0.116	0.134	0.204	0.302	0.332	0.431	0.192	0.0468 U	0.0873 J	0.301
Diethyl phthalate	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Dimethyl phthalate	NS	0.0489 U	0.0516 U	0.446	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Fluoranthene	100	5.53	5.67	2.37	6.07	4.17	2.42	1.82	1.0400	1.46	4.17
Fluorene	100	0.173	0.154	0.272	0.418	0.433	0.636	0.25	0.0582 J	0.133	0.37
Hexachlorobenzene	1.2	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Hexachlorobutadiene	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Hexachlorocyclopentadiene	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Hexachloroethane	NS	0.0489 U	0.0516 U	0.0793 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Indeno(1,2,3-cd)pyrene	0.5	1.63	1.54	0.405	1.47	1.01	0.547	0.498	0.3570	0.391	0.973
Isophorone	NS	0.0489 U	0.0516 U	0.272	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
n-Nitrosodi-n-propylamine	NS	0.0489 U	0.0516 U	0.0915 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Naphthalene	100	0.122	0.106	0.131	0.381	0.398	0.739	0.259	0.0468 U	0.104	0.312
NDPA/DPA	NS	0.0489 U	0.0516 U	0.118	0.0485 U	0.0417 U	0.0491 U	0.0618 J	0.0468 U	0.0502 U	0.0491 U
Nitrobenzene	NS	0.0489 U	0.0516 U	0.0824 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
N-Nitrosodimethylamine	NS	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
p-Chloro-m-cresol	NS	0.0489 U	0.0516 U	0.077 J	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Pentachlorophenol	6.7	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Phenanthrene	100	3.71	3.74	1.86	4.87	3.72	3.55	1.89	0.5560	1.16	4.43
Phenol	100	0.0489 U	0.0516 U	0.0478 U	0.0485 U	0.0417 U	0.0491 U	0.0485 U	0.0468 U	0.0502 U	0.0491 U
Pyrene	100	5.7	4.86	2.16	5.4	3.68	2.93	2.35	1.1700	1.68	3.7
Pyridine	NS	0.195 U	0.206 U	0.191 U	0.194 U	0.167 U	0.196 U	0.194 U	0.187 U	0.201 U	0.196 U

Sample ID:	NYSDEC Soil Cleanup Objectives - Restricted Residential Use[2]	EP011	EP012	DUP	EP013	SW001	SW002	SW003	SW004	EP014	EP015
Sampling Date:		10/28/2022	10/28/2022	10/28/2022	12/12/2022	12/12/2022	12/12/2022	12/12/2022	12/12/2022	12/28/2022	12/28/2022
Lab Sample ID:		22J1513-11	22J1513-12	22J1513-13	22L1279-01	22L1279-02	22L1279-03	22L1279-04	22L1279-05	22L1385-01	22L1385-02
Sample Depth:		2'	2'	NA	18'	13'	13'	13'	13'	18'	18'
Semivolatile Organic Compounds by USEPA Method 8270 in mg/kg											
1,1-Biphenyl	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.115 D	0.0568 U
1,2,4,5-Tetrachlorobenzene	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
1,2,4-Trichlorobenzene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
1,2-Dichlorobenzene	100	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
1,2-Diphenylhydrazine (as Azobenzene)	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
1,3-Dichlorobenzene	49	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
1,4-Dichlorobenzene	13	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2,3,4,6-Tetrachlorophenol	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
2,4,5-Trichlorophenol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2,4,6-Trichlorophenol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2,4-Dichlorophenol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2,4-Dimethylphenol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2,4-Dinitrophenol	NS	0.1 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.1 U	0.113 U
2,4-Dinitrotoluene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2,6-Dinitrotoluene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2-Chloronaphthalene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2-Chlorophenol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2-Methylnaphthalene	NS	0.0952 J	0.153	0.0976	0.167	0.0957	0.078 J	0.0516 U	0.0485 U	0.531 D	0.202
2-Methylphenol	100	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
2-Nitroaniline	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
2-Nitrophenol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
3,3'-Dichlorobenzidine	100	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
3- & 4-Methylphenols	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
3-Nitroaniline	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
4,6-Dinitro-o-cresol	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
4-Bromophenyl phenyl ether	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
4-Chloroaniline	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
4-Chlorophenyl phenyl ether	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
4-Nitroaniline	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
4-Nitrophenol	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
Acenaphthene	100	0.268	0.407	0.244	0.516	0.119	0.092 J	0.0516 U	2.13	2.52	0.794
Acenaphthylene	100	0.0763 J	0.126	0.0615 J	0.0673 J	0.0465 U	0.440	0.0791 J	3.03	0.615	0.251
Acetophenone	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Aniline	NS	0.197 U	0.197 U	0.192 U	0.234 U	0.186 U	0.200 U	0.206 U	0.194 U	0.217 U	0.227 U
Anthracene	100	0.529	0.743	0.363	0.203	0.101	0.115	0.0516 U	4.23	1.73	0.757
Atrazine	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Benzaldehyde	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Benzidine	NS	0.197 U	0.197 U	0.192 U	0.234 U	0.186 U	0.200 U	0.206 U	0.194 U	0.217 U	0.227 U
Benzo(a)anthracene	1	1.21	1.51	0.827	0.474	0.231	0.384	0.112	4.93	3.61	1.93
Benzo(a)pyrene	1	0.934	1.26	0.56	0.419	0.219	0.572	0.143	4.65	3.6	2.01
Benzo(b)fluoranthene	1	0.77	1.04	0.495	0.297	0.188	0.362	0.0865 J	2.53	2.96	1.51
Benzo(ghi)perylene	100	0.582	0.646	0.409	0.211	0.131	0.430	0.0964 J	2.86	1.7	0.791
Benzo(k)fluoranthene	3.9	0.722	0.992	0.407	0.337	0.168	0.429	0.114	2.79	3.14	1.66
Benzoic Acid	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Benzyl Alcohol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Bis(2-chloroethoxy)methane	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Bis(2-chloroethyl)ether	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Bis(2-chloroisopropyl)ether	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Bis(2-ethylhexyl)phthalate	NS	0.0493 U	0.0494 U	0.169	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Butyl benzyl phthalate	NS	0.0493 U	0.0646 J	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Caprolactam	NS	0.0984 U	0.0986 U	0.0961 U	0.117 U	0.0928 U	0.100 U	0.103 U	0.0968 U	0.109 U	0.113 U
Carbazole	NS	0.18	0.252	0.12	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0844 J	0.181	0.0843 J
Chrysene	3.9	1.1	1.4	0.667	0.448	0.209	0.371	0.105	4.95	3.67	1.87
Di-n-butylphthalate	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Di-n-octylphthalate	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0761 J
Dibenzo(a,h)anthracene	0.33	0.0991	0.142	0.0822 J	0.0795 J	0.0465 U	0.076 J	0.0516 U	0.562	0.439	0.314
Dibenzofuran	59	0.169	0.266	0.143	0.127	0.0534 J	0.050 U	0.0516 U	0.0766 J	0.0544 U	0.218
Diethyl phthalate	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Dimethyl phthalate	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Fluoranthene	100	2.47	3.58	1.69	1.1	0.484	0.604	0.204	9.97	8.09	3.92
Fluorene	100	0.238	0.37	0.207	0.254	0.0698 J	0.086 J	0.0516 U	0.164	1.39	0.479
Hexachlorobenzene	1.2	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Hexachlorobutadiene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Hexachlorocyclopentadiene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Hexachloroethane	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Indeno(1,2,3-cd)pyrene	0.5	0.744	0.843	0.495	0.234	0.133	0.337	0.0807 J	2.19	1.6	0.726
Isophorone	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
n-Nitrosodi-n-propylamine	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Naphthalene	100	0.107	0.179	0.0891 J	0.0841 J	0.105	0.116	0.0516 U	0.0844 J	0.717	0.481
NDPA/DPA	NS	0.0493 U	0.0494 U	0.0492 J	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Nitrobenzene	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
N-Nitrosodimethylamine	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
p-Chloro-m-cresol	NS	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Pentachlorophenol	6.7	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Phenanthrene	100	2.44	3.27	1.59	1.01	0.373	0.241	0.14	1.44	3.11	1.53
Phenol	100	0.0493 U	0.0494 U	0.0482 U	0.0586 U	0.0465 U	0.050 U	0.0516 U	0.0485 U	0.0544 U	0.0568 U
Pyrene	100	2.34	2.89	2.18	0.885	0.433	0.706	0.25	15.8	6.67	3.22
Pyridine	NS	0.197 U	0.197 U	0.192 U	0.234 U	0.186 U	0.200 U	0.206 U	0.194 U	0.217 U	0.227 U

Sample ID:	NYSDEC Soil Cleanup Objectives - Restricted Residential Use[2]	EP016	EP017	SW005	SW006	SW007	SW008	DUP	EP018	SW009	SW010
Sampling Date:		1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/18/2023	1/20/2023	1/20/2023	1/20/2023
Lab Sample ID:		23A0851-01	23A0851-02	23A0851-03	23A0851-04	23A0851-05	23A0851-06	23A0851-07	23A1047-01	23A1047-02	23A1047-03
Sample Depth:		18'	18'	13'	13'	13'	13'	NA	18'	13'	13'
Semivolatile Organic Compounds by USEPA Method 8270 in mg/kg											
1,1-Biphenyl	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.294 D	0.0452 U	0.0624 U	0.0634 U	0.0642 U
1,2,4,5-Tetrachlorobenzene	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
1,2,4-Trichlorobenzene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
1,2-Dichlorobenzene	100	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
1,2-Diphenylhydrazine (as Azobenzene)	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
1,3-Dichlorobenzene	49	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
1,4-Dichlorobenzene	13	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2,3,4,6-Tetrachlorophenol	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
2,4,5-Trichlorophenol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2,4,6-Trichlorophenol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2,4-Dichlorophenol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2,4-Dimethylphenol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2,4-Dinitrophenol	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
2,4-Dinitrotoluene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2,6-Dinitrotoluene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2-Chloronaphthalene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2-Chlorophenol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2-Methylnaphthalene	NS	0.15 D	0.0611 U	0.143	0.1260 U	0.0869 J	1.36	0.0452 U	0.164	0.22	0.122 J
2-Methylphenol	100	0.0629	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
2-Nitroaniline	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
2-Nitrophenol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
3,3'-Dichlorobenzidine	100	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
3- & 4-Methylphenols	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.288	0.0452 U	0.0624 U	0.0634 U	0.0642 U
3-Nitroaniline	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
4,6-Dinitro-o-cresol	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
4-Bromophenyl phenyl ether	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
4-Chloroaniline	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
4-Chlorophenyl phenyl ether	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
4-Nitroaniline	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
4-Nitrophenol	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
Acenaphthene	100	0.101 J	0.0611 U	0.771	0.1260 U	0.107	1.27	0.167	0.387	0.451	0.168
Acenaphthylene	100	0.0629 U	0.0611 U	0.0758 J	0.1260 U	0.0486 U	2.01	0.0452 U	0.0624 U	0.0798 J	0.0642 U
Acetophenone	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Aniline	NS	0.251 U	0.244 U	0.184 U	0.5020 U	0.194 U	0.203 U	0.18 U	0.249 U	0.253 U	0.256 U
Anthracene	100	0.12 J	0.0611 U	1.48	0.126 U	0.305	3.79	0.303	0.703	0.749	0.282
Atrazine	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Benzaldehyde	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Benzidine	NS	0.251 U	0.244 U	0.184 U	0.5020 U	0.194 U	0.203 U	0.18 U	0.249 U	0.253 U	0.256 U
Benzo(a)anthracene	1	0.246	0.0611 U	2.79	0.126 U	0.432	8.31	0.586	0.954	0.984	0.604
Benzo(a)pyrene	1	0.193	0.0611 U	2.39	0.1260 U	0.396	6.06	0.47	0.798	0.875	0.54
Benzo(b)fluoranthene	1	0.166	0.0611 U	1.95	0.1260 U	0.334	4.86	0.388	0.599	0.691	0.49
Benzo(ghi)perylene	100	0.111 J	0.0611 U	1.23	0.1260 U	0.23	3.52	0.238	0.437	0.467	0.324
Benzo(k)fluoranthene	3.9	0.163	0.0611 U	1.79	0.1260 U	0.295	6.26	0.396	0.639	0.72	0.468
Benzoic Acid	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Benzyl Alcohol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Bis(2-chloroethoxy)methane	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Bis(2-chloroethyl)ether	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Bis(2-chloroisopropyl)ether	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Bis(2-ethylhexyl)phthalate	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.052 J	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Butyl benzyl phthalate	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Caprolactam	NS	0.125 U	0.122 U	0.092 U	0.2510 U	0.097 U	0.102 U	0.0901 U	0.125 U	0.126 U	0.128 U
Carbazole	NS	0.0629 U	0.0611 U	0.526	0.1260 U	0.155	1.57	0.0929	0.221	0.254 D	0.121 J
Chrysene	3.9	0.23	0.0611 U	3.11	0.1260 U	0.427	8.93	0.607	0.896	1	0.666
Di-n-butylphthalate	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	12.5	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Di-n-octylphthalate	NS	0.0629 U	0.0611 U	0.0471 J	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Dibenzo(a,h)anthracene	0.33	0.0629 U	0.0611 U	0.285	0.1260 U	0.0486 U	1.33	0.0468 J	0.164	0.173	0.115 J
Dibenzofuran	59	0.0629 U	0.0611 U	0.505	0.1260 U	0.109	2.04	0.117	0.246	0.0634 U	0.127 J
Diethyl phthalate	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Dimethyl phthalate	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Fluoranthene	100	0.547	0.0611 U	6.61	0.1260 U	1.02	20.8	1.46	2.05	2.44	1.42
Fluorene	100	0.0872 J	0.0611 U	0.72	0.1260 U	0.164	3.27	0.163	0.411	0.0634 U	0.195
Hexachlorobenzene	1.2	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Hexachlorobutadiene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Hexachlorocyclopentadiene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Hexachloroethane	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Indeno(1,2,3-cd)pyrene	0.5	0.129	0.0611 U	1.3	0.1260 U	0.245	4.16	0.255	0.482	0.312	0.376
Isophorone	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
n-Nitrosodi-n-propylamine	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Naphthalene	100	0.141	0.0611 U	0.158	0.1260 U	0.231	2.15	0.0512 J	0.139	0.155	0.143
NDPA/DPA	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Nitrobenzene	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
N-Nitrosodimethylamine	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
p-Chloro-m-cresol	NS	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Pentachlorophenol	6.7	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.0509 U	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Phenanthrene	100	0.513	0.0611 U	4.24	0.1260 U	1.18	21.6	1	2.29	2.64	1.36
Phenol	100	0.0629 U	0.0611 U	0.0461 U	0.1260 U	0.0486 U	0.154	0.0452 U	0.0624 U	0.0634 U	0.0642 U
Pyrene	100	0.497	0.0611 U	6.64	0.1260 U	0.883	17.9	1.42	1.97	2.35	1.31
Pyridine	NS	0.251 U	0.244 U	0.184 U	0.502 U	0.194 U	0.203 U	0.18 U	0.249 U	0.253 U	0.256 U

Notes:
[1] NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a 12/06
** Semivolatile Organics by GC/MS
NA- Not Analyzed
NS- No Standard
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
D- Result is from an analysis that required a dilution
Highlighted text denotes concentrations exceeding the NYSDEC Restricted Residneital Use SCO

Table 4
Remedial Endpoint Sample Analytical Data - SVOCs
204 4th Avenue, Brooklyn, NY

Sample ID:		EP001		EP002		EP003		EP004		EP005		EP006		EP007		EP008		EP009		EP010		EP011		EP012		DUP		EP013		SW001		SW002		SW003		SW004		EP014		EP015		EP016		EP017		SW005		SW006		SW007		SW008		DUP		EP018		SW009		SW010	
Sampling Date:	NYSDEC Soil Cleanup Objectives	10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		12/12/2022		12/12/2022		12/12/2022		12/12/2022		12/12/2022		12/28/2022		12/28/2022		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/20/2023		1/20/2023		1/20/2023	
Lab Sample ID:	Unrestricted Use[1]	22J1513-01		22J1513-02		22J1513-03		22J1513-04		22J1513-05		22J1513-06		22J1513-07		22J1513-08		22J1513-09		22J1513-10		22J1513-11		22J1513-12		22J1513-13		22L1279-01		22L1279-02		22L1279-03		22L1279-04		22L1279-05		22L1385-01		22L1385-02		23A0851-01		23A0851-02		23A0851-03		23A0851-04		23A0851-05		23A0851-06		23A0851-07		23A1047-01		23A1047-02		23A1047-03	
Sample Depth:		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		NA		18'		13'		13'		13'		13'		18'		18'		18'		18'		13'		13'		13'		13'		18'		13'		13'	
Metals by USEPA Method 6010C in mg/kg																																																										
Aluminum, Total	NS	8,910		9,850		8,680		9,170		5,950		8,540		8,530		8,050		8,520		9,000		8,110		11,200		7,710		11,200		6,480		7,820		7,310		10,100		6,680		5,510		7,990		7,410		7,140		6,270		8,120		8,450		7,990		7,320		7,190		5,460	
Antimony, Total	NS	2.45	U	2.58	U	2.41	U	2.46	U	2.09	U	2.46	U	2.46	U	4.47		2.52	U	2.48	U	2.47	U	2.48	U	2.43	U	2.95	U	2.36	U	2.56	U	2.59	U	2.44	U	3.02		2.84	U	3.19	U	3.06	U	2.31	U	6.33	U	2.49	U	2.58	U	2.3	U	3.14	U	3.19	U	3.23	U
Arsenic, Total	16	12.7		7.79		8.23		9.58		6.01		14.6		9.38		10.2		9.74		10.8		11.8		12.1		8.6		6.77		3.97		3.01		2.68		12.8		9.03		23.7		16.2		16.4		3.46		3.8	U	11		12.8		3.46		14.8		12.9		11.6	
Barium, Total	400	251		948		302		253		147		207		282		228		264		290		262		333		203		77.4		175		60.6		29.7		1350		166		194		265		321		65.5		45		80.6		285		56.5		225		213		199	
Beryllium, Total	72	0.049	U	0.052	U	0.049	U	0.05	U	0.042	U	0.05	U	0.05	U	0.047	U	0.051	U	0.05	U	0.05	U	0.05	U	0.049	U	0.972		0.61		0.706		0.678		0.894		0.673		0.715		0.707		0.658		0.403		0.404		0.471		0.578		0.432		0.764		0.782		0.57	
Cadmium, Total	4.3	0.585		0.654		0.347		0.518		0.316		0.436		0.329		0.61		0.354		0.348		0.474		0.767		0.292	U	0.354	U	0.286		0.308	U	0.311	U	0.843		0.327	U	0.341	U	0.383	U	0.368	U	0.277	U	0.759	U	0.299	U	0.512		0.276	U	0.377	U	0.383	U	0.388	U
Calcium, Total	NS	86,500		60,800		49,500		58,400		38,400		60,500		64,100		62,200		58,800		77,300		78,400		96,100		57,500		3,680		26,400		6,600		1,110		51,100		8,830	B	7,360	B	11,400		10,100		5,580		6,550		8,370		24,300		3,460		9,990		9,970		8,520	
Chromium, Total	110	47		28.9		28.7		30.5		22.1		41.7		36.5		30.1		38.9		45.4		40.9		53.7		34.1		21.9		20		13.7		13.6		24.3		13.3		12.4		17		16.7		14.7		15.4		14.1		21.7		16.9		12.5		13.3		10.2	
Cobalt, Total	NS	7.74		8.5		6.62		7.59		5.08		6.97		6.59		6.76		6.38		6.46		6.79		8.57		5.81		8.19		5.48		5.82		5.9		10.4		7.37		7.79		9.1		8.85		6.29		4.69		6.89		7.56		6.49		8.48		9.81		6.91	
Copper, Total	270	66.5		80.8		81.8		208		140		78.6		53.9		57		47.8		52.4		112		119		40.2		29.7		30.6		16.3		12.3		52.9		49		36.8		57.2		68.1		46.6		10.8		65.3		117		46.4		66		50.2		37.2	
Iron, Total	NS	13,300		16,900		14,400		15,700		9,490		13,800		13,200		31,300		13,000		12,900		22,100		18,000		12,300		14,600		11,300		11,400		11,100		31,600		11,600		10,100		11,500		10,100		12,500		11,300		18,500		16,400		13,400		9,740		9,950		8,040	
Lead, Total	400	244		821		337		336		216		237		233		512		212		226		281		335		160		108		152		50.5		12.9		1550		182		360		452		1210		98.6		26.1		544		456		77		831		829		372	
Magnesium, Total	NS	8,420		13,700		4,670		6,370		4,180		4,770		7,310		8,830		5,440		6,380		7,490		8,460		6,200		3,700		5,260		2,890		2,450		5,470		1,540		1,050		1,500		985		2,520		3,030		2,940		4,340		2,810		1,030		947		851	
Manganese, Total	2,000	331		364		369		270		146		198		219		283		212		228		423		327		203		241		179		118		112		509		146		154		154		132		270		166		310		236		201		207		111		142	
Mercury, Total	0.81	0.625		1.46		1.15		1.67		1.31		1.09		1.31		0.676		0.457		0.405		0.705		0.733		0.408		0.851		2.5		0.0369	U	0.0373	U	0.0479		2.16		1.48		1.17		3.61		0.446		0.0911	U	0.867		2.46		0.439		2.3		3.18		1.64	
Nickel	310	34.2		32.9		27.4		31.1		22		32.3		25.6		30.4		27.6		28.6		29.6		43.3		27.2		28.9		18.6		13.8		15.1		34.2		16.3		16.3		21.7		19.3		22		13.1		29.7		26.8		22.3		19.7		21.1		14.7	
Potassium, Total	NS	1890		1580		1390		1810		1050		1580		1830		1480		1820		1940		1840		1880		1680		1730	B	1070	B	1210	B	1020	B	2980	B	961		741		849	B	789	B	856	B	2080	B	945	B	1250	B	1060		1010		927		707	
Selenium, Total	180	2.45	U	2.58	U	2.41	U	2.46	U	2.09	U	2.46	U	2.46	U	2.35	U	2.52	U	2.48	U	2.47	U	2.48	U	2.43	U	2.95	U	2.36	U	2.56	U	2.59	U	2.44	U	2.72	U	2.84	U	3.19	U	3.06	U	2.31	U	6.33	U	2.49	U	2.58	U	2.3	U	3.14	U	3.19	U	3.23	U
Silver, Total	180	0.494	U	0.521	U	0.485	U	0.495	U	0.422	U	0.495	U	0.495	U	0.473	U	0.508	U	0.5	U	0.499	U	0.5	U	0.49	U	0.595	U	0.475	U	0.517	U	0.522	U	0.493	U	0.549	U	0.573	U	4.62		0.618	U	0.465	U	1.28	U	0.502	U	0.52	U	0.464	U	0.634	U	0.643	U	0.651	U
Sodium, Total	NS	734		485		533		809		405		487		632		484		642		795		835		736		629		411		161		113		163		252		456		389		688		725		105		2040		184		302		117		730		663		533	
Thallium, Total	NS	2.45	U	2.58	U	2.41	U	2.46	U	2.09	U	2.46	U	2.46	U	2.35	U	2.52	U	2.48	U	2.47	U	2.48	U	2.43	U	2.95	U	2.36	U	2.56	U	2.59	U	2.44	U	2.72	U	2.84	U	3.19	U	3.06	U	2.31	U	6.33	U	2.49	U	2.58	U	2.3	U	3.14	U	3.19	U	3.23	U
Vanadium, Total	NS	29.7		28.7		27.1		34.1		20.3		26		28.1		22.1		25.2		27.1		31.7		33.5		22.3		32.3		20		20.8		21		35.2		24.4		25.2		37.1		32.7		18.6		22.3		21.1		26.8		22.5		34.6		34.5		27.2	
Zinc, Total	10,000	318		419		208		260		169		204		188		230		176		189		222		322		142		66.1		107		43.9		30.1		617		99.2		85.9		189		225		65.4		38.2		129		368		66.3		132		152		123	

Notes:

[1] NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a 12/06

NA- Not Analyzed

NS- No Standard

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

U - Indicates the analyte was analyzed for but not detected.

B- Analyte found in the analysis batch blank

Highlighted text denotes concentrations exceeding the NYSDEC Restricted Residneital Use SCO

Table 5
Remedial Endpoint Sample Analytical Data - SVOCs
204 4th Avenue, Brooklyn, NY

Sample ID:		EP001		EP002		EP003		EP004		EP005		EP006		EP007		EP008		EP009		EP010		EP011		EP012		DUP		EP013		SW001		SW002		SW003		SW004		EP014		EP015		EP016		EP017		SW005		SW006		SW007		SW008		DUP		EP018		SW009		SW010	
Sampling Date:	NYSDEC Soil Cleanup Objectives	10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		10/25/2022		12/12/2022		12/12/2022		12/12/2022		12/12/2022		12/12/2022		12/25/2022		12/25/2022		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/20/2023		1/20/2023	
Lab Sample ID:	Restricted Residential Use[1]	22J1513-01		22J1513-02		22J1513-03		22J1513-04		22J1513-05		22J1513-06		22J1513-07		22J1513-08		22J1513-09		22J1513-10		22J1513-11		22J1513-12		22J1513-13		22L1279-01		22L1279-02		22L1279-03		22L1279-04		22L1279-05		22L1385-01		22L1385-02		23A0851-01		23A0851-02		23A0851-03		23A0851-04		23A0851-05		23A0851-06		23A0851-07		23A1047-01		23A1047-02		23A1047-03	
Sample Depth:		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		NA		18'		13'		13'		13'		13'		18'		18'		18'		18'		13'		13'		13'		NA		18'		13'		13'	
Organochlorine Pesticides by USEPA Method 8081 in mg/kg																																																										
4,4'-DDD	13	0.00193	U	0.00204	U	0.00190	U	0.00343		0.00433		0.00605		0.00389		0.00382		0.00223	D	0.00198		0.00252		0.00306		0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00247		0.00177	U	0.00248	U	0.00251	U	0.00251	U
4,4'-DDE	8.9	0.00193	U	0.00204	U	0.00190	U	0.00224		0.00214		0.00198		0.00251		0.0018	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00234		0.00177	U	0.00248	U	0.00251	U	0.00251	U
4,4'-DDT	7.9	0.00262		0.00384		0.00279		0.00509		0.00447		0.00199		0.00246		0.00653		0.00205	D	0.00391		0.00291		0.00663		0.00511		0.00432		0.00196		0.00779		0.00260		0.00192	U	0.00596		0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Aldrin	0.097	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Alpha-BHC	0.48	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Beta-BHC	0.36	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Chlordane, total	NS	NT		NT		NT		NT		NT		NT		NT		0.03670	U	0.03940	U	0.03910	U	NT		NT		NT		0.04600	U	0.03660	U	0.03960	U	0.04090	U	0.03830	U	0.04300	U	0.04490	U	0.04990	U	0.04730	U	0.03620	U	0.09760	U	0.03830	U	0.04030	U	0.03540	U	0.04960	U	0.05020	U	0.05020	U
cis/alpha-Chlordane	4.2	0.0019	U	0.0024		0.0019	U	0.0019	U	0.0016	U	0.0026		0.0136		0.0018	U	0.0020	U	0.0020	U	0.0020	U	0.0019	U	0.0019	U	0.0023	U	0.0018	U	0.0020	U	0.0021	U	0.0019	U	0.0022	U	0.0022	U	0.0025	U	0.0024	U	0.0018	U	0.0049	U	0.0019	U	0.0020	U	0.0018	U	0.0025	U	0.0025	U	0.0025	U
Delta-BHC	100	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Dieldrin	0.2	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Endosulfan I	24	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Endosulfan II	24	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Endosulfan sulfate	24	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Endrin	11	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Endrin aldehyde	NS	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Endrin ketone	NS	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
gamma-Chlordane	NS	0.00193	U	0.00234	D	0.00190	U	0.00192	U	0.00433		0.00248		0.01290		0.00183	U	0.00197	U	0.00196	U	NT		NT		NT		0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Heptachlor	2.1	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Heptachlor epoxide	NS	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Lindane (gamma-BHC)	1.3	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Methoxychlor	NS	0.00193	U	0.00204	U	0.00190	U	0.00192	U	0.00164	U	0.00193	U	0.00193	U	0.00183	U	0.00197	U	0.00196	U	0.00195	U	0.00194	U	0.00192	U	0.00230	U	0.00183	U	0.00198	U	0.00205	U	0.00192	U	0.00215	U	0.00224	U	0.00250	U	0.00236	U	0.00181	U	0.00488	U	0.00191	U	0.00202	U	0.00177	U	0.00248	U	0.00251	U	0.00251	U
Toxaphene	NS	0.193	U	0.204	U	0.190	U	0.192	U	0.164	U	0.193	U	0.193	U	0.183	U	0.197	U	0.196	U	0.195	U	0.194	U	0.192	U	0.230	U	0.183	U	0.198	U	0.205	U	0.192	U	0.215	U	0.224	U	0.250	U	0.236	U	0.181	U	0.488	U	0.191	U	0.202	U	0.177	U	0.248	U	0.251	U	0.251	U
Polychlorinated Biphenyls (PCBs) by USEPA Method 8082A in mg/kg																																																										
Arcolor 1016	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
Arcolor 1221	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
Arcolor 1232	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
Arcolor 1242	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
Arcolor 1248	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
Arcolor 1254	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
Arcolor 1260	NS	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U
PCBs, Total	1	0.0195	U	0.0206	U	0.0192	U	0.0194	U	0.0165	U	0.0195	U	0.0194	U	0.0185	U	0.0199	U	0.0198	U	0.0197	U	0.0196	U	0.0194	U	0.0232	U	0.0185	U	0.0200	U	0.0206	U	0.0193	U	0.0217	U	0.0226	U	0.0252	U	0.0239	U	0.0183	U	0.0493	U	0.0193	U	0.0204	U	0.0179	U	0.0251	U	0.0253	U	0.0253	U

Notes:
[1] NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a 12/06
NA- Not Analyzed
NS- No Standard
P - The RPD between the results for the two columns exceeds the method-specified criteria.
I - The lower value for the two columns has been reported due to obvious interference.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
Highlighted text denotes concentrations exceeding the NYSDEC Restricted Residneital Use SCO

Table 6
Remedial Endpoint Sample Analytical Data - SVOCs
204 4th Avenue, Brooklyn, NY

Sample ID:	NYSDEC Soil Cleanup Objectives Restricted Residential Use[1]	EP001		EP002		EP003		EP004		EP005		EP006		EP007		EP008		EP009		EP010		EP011		EP012		DUP		EP013		SW001		SW002		SW003		SW004		EP014		EP015		EP016		EP017		SW005		SW006		SW007		SW008		DUP		EP018		SW009		SW010	
Sampling Date:		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		10/28/2022		12/12/2022		12/12/2022		12/12/2022		12/12/2022		12/12/2022		12/28/2022		12/28/2022		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/18/2023		1/14/2023		1/20/2023		1/20/2023		1/20/2023	
Lab Sample ID:		22J1513-01		22J1513-02		22J1513-03		22J1513-04		22J1513-05		22J1513-06		22J1513-07		22J1513-08		22J1513-09		22J1513-10		22J1513-11		22J1513-12		22J1513-13		22L1279-01		22L1279-02		22L1279-03		22L1279-04		22L1279-05		22L1385-01		22L1385-02		23A0851-01		23A0851-02		23A0851-03		23A0851-04		23A0851-05		23A0851-06		23A0851-07		23A1047-01		23A1047-02		23A1047-03	
Sample Depth:		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		2'		NA		13'		13'		13'		13'		13'		18'		18'		18'		18'		13'		13'		13'		13'		NA		18'		13'		13'	
Perfluorinated Alkyl Acids by Isotope Dilution by USEPA Method 537 in mg/kg																																																											
1H,1H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
1H,1H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorobutanesulfonic Acid (PFBS)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorobutanoic Acid (PFBA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorodecanesulfonic Acid (PFDS)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorodecanoic Acid (PFDA)	NS	0.0003	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorododecanoic Acid (PFDoA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluoroheptanesulfonic Acid (PFHpS)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluoroheptanoic Acid (PFHpA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorohexanesulfonic Acid (PFHxS)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorohexanoic Acid (PFHxA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorononanoic Acid (PFNA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorooctanesulfonamide (FOSA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorooctanesulfonic Acid (PFOS)	0.88	0.00029	U	0.00048		0.00028	U	0.00029	U	0.00033		0.00053		0.00029	U	0.00027	U	0.00034		0.00035		0.00068		0.00061		0.00039		0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorooctanoic Acid (PFOA)	0.66	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00066		0.00028		0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluoropentanoic Acid (PFPeA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorotetradecanoic Acid (PFTA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluorotridecanoic Acid (PFTrDA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00035	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U
Perfluoroundecanoic Acid (PFUnA)	NS	0.00029	U	0.00029	U	0.00028	U	0.00029	U	0.00025	U	0.00028	U	0.00029	U	0.00027	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00028	U	0.00030	U	0.00026	U	0.00030	U	0.00030	U	0.00029	U	0.00032	U	0.00033	U	0.00038	U	0.00036	U	0.00027	U	0.00070	U	0.00029	U	0.00030	U	0.00027	U	0.00037	U	0.00036	U	0.00037	U

Notes:
[1] NYSDEC Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs, June 2021
*- Perfluorinated Alkyl Acids by NYSDEC Target List
NA- Not Analyzed
NS- No Standard
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
U - Indicates the analyte was analyzed for but not detected.
Highlighted text denotes concentrations exceeding the NYSDEC Restricted Residential Use SCO

Table 7
Post Remedial Groundwater Analytical Data - VOCs
204 4th Avenue, Brooklyn, New York

Sample ID:	NYSDEC AWQS[1]	MW001	MW002	MW003		MW004	MW005	MW006	DUP (MW006)
Sampling Date:		10/4/2203	10/4/2023	7/13/2023	8/8/2023	8/8/2023	7/13/2023	7/13/2023	7/13/2023
Lab Sample ID:		23J0403-01	23J0403-02	23G0783-04	23H0686-01	23H0686-02	23G0783-01	23G0783-02	23G0783-03
Volatile Organic Compounds by CP-51 List in ug/L									
1,2,4-Trimethylbenzene	5	0.31 U	0.31 U	0.46 J	3.1 U	0.31 U	0.2 U	0.44 J	0.41 J
1,3,5-Trimethylbenzene	5	0.35 U	0.35 U	0.2 U	3.47 U	0.347 U	0.2 U	0.27 J	0.26 J
Benzene	1	0.28 U	0.28 U	**1.3**	2.79 U	0.279 U	0.52	0.2 J	0.2 U
Ethyl Benzene	5	0.29 U	0.29 U	1.1	2.9 U	0.29 U	0.2 U	0.2 U	0.2 U
Isopropylbenzene	5	0.41 U	0.41 U	0.89	4.05 U	0.405 U	0.53	1.4	1.3
Methyl tert-butyl ether (MTBE)	10	0.40 J	0.24 U	**440**	**433**	**20.5**	0.53	3.6	3.4
Naphthalene	10	0.21 U	0.21 U	5.1	**16.6 J**	0.47 J	1 U	1 U	1 U
n-Butylbenzene	5	0.40 U	0.40 U	0.2 U	3.99 U	0.399 U	0.56	0.2 U	0.2 U
n-Propylbenzene	5	0.38 U	0.38 U	1.4	3.84 U	0.384 U	1.8	0.61	0.58
o-Xylene	5	0.26 U	0.26 U	0.2 J	2.61 U	0.261 U	0.2 U	0.2 U	0.2 U
p- & m- Xylenes	NS	0.58 U	0.58 U	0.5 U	5.78 U	0.578 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	5	0.38 U	0.38 U	0.2 U	3.77 U	0.377 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	5	0.44 U	0.44 U	0.2 U	4.44 U	0.444 U	0.75	0.89	0.86
tert-Butylbenzene	5	0.37 U	0.37 U	0.2 U	3.67 U	0.367 U	0.2 U	0.2 U	0.2 U
Toluene	5	0.35 U	0.35 U	0.78	3.46 U	0.346 U	0.59	0.25 J	0.24 J
Xylenes, Total	5	0.84 U	0.84 U	0.6 U	8.36 U	0.836 U	0.6 U	0.6 U	0.6 U

Notes:
[1] New York DEC TOGS - Ambient Water Quality Standards (AWQS)
NA- Not Analyzed
NS- No Standard
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
Highlighted text denotes concentrations exceeding the NYSDEC AWQS.

Table 8
Soil Vapor Sample Analytical Data Summary
Volatile Organic Compounds

204 4th Avenue, Brooklyn, NY

Client Sample ID: Sample Depth (bgs): Laboratory ID: Sampling Date:	NYSDOH Sub-Salb Matrix Values (1)	USEPA VISL (2)	SV001 10' L10907143-01 2/22/2019	SV002 10' L10907143-02 2/22/2019	SV003 10' L10907143-03 2/22/2019	SV004 10' L10907143-04 2/22/2019	SV005 10' L10907143-05 2/22/2019	SV006 10' L10907143-06 2/22/2019	OA001 Above Ground L1907143-07 2/22/2019
Volatile Organic Compounds by USEPA Method TO-15 in µg/m³									
1,1,1-Trichloroethane	100	170,000	1.09 U	5.46 U	58.9 U	3.58 U	1.09 U	1,950 U	1.09 U
1,1,2,2-Tetrachloroethane	NS	1.6	1.37 U	6.87 U	74.2 U	4.5 U	1.37 U	2,450 U	1.37 U
1,1,2-Trichloroethane	NS	5.8	1.09 U	5.46 U	58.9 U	3.58 U	1.09 U	1,950 U	1.09 U
1,1-Dichloroethane	NS	58	0.809 U	4.05 U	43.7 U	2.66 U	0.809 U	1,440 U	0.809 U
1,1-Dichloroethene	6	7,000	0.793 U	3.96 U	42.8 U	2.6 U	0.793 U	1,420 U	0.793 U
1,2,4-Trichlorobenzene	NS	70	1.48 U	7.42 U	80.2 U	4.87 U	1.48 U	2,650 U	1.48 U
1,2,4-Trimethylbenzene	NS	2,100	2.21	4.92 U	53.1 U	3.22 U	1.21	1,760 U	0.983 U
1,2-Dibromoethane	NS	0.16	1.54 U	7.69 U	83 U	5.04 U	1.54 U	2,740 U	1.54 U
1,2-Dichlorobenzene	NS	7,000	1.2 U	6.01 U	64.9 U	3.94 U	1.2 U	2,150 U	1.2 U
1,2-Dichloroethane	NS	3.6	0.809 U	4.05 U	43.7 U	2.66 U	0.809 U	1,440 U	0.809 U
1,2-Dichloropropane	NS	25	0.924 U	4.62 U	49.9 U	3.03 U	0.924 U	1,650 U	0.924 U
1,3,5-Trimethylbenzene	NS	2,100	0.983 U	4.92 U	53.1 U	3.22 U	0.983 U	1,760 U	0.983 U
1,3-Butadiene	NS	3.1	0.442 U	2.21 U	23.9 U	1.45 U	0.467	790 U	0.442 U
1,3-Dichlorobenzene	NS	NS	1.2 U	6.01 U	64.9 U	3.94 U	1.2 U	2,150 U	1.2 U
1,4-Dichlorobenzene	NS	8.5	1.2 U	6.01 U	64.9 U	3.94 U	1.2 U	2,150 U	1.2 U
1,4-Dioxane	NS	19	0.721 U	3.6 U	38.9 U	2.36 U	0.721 U	1,290 U	0.721 U
2,2,4-Trimethylpentane	NS	NS	2.62	2,010	12,100	1,010	12.4	509,000	0.934 U
2-Butanone	NS	170,000	2.21	7.4 U	79.3 U	4.84 U	2.51	2,630 U	1.47 U
2-Hexanone	NS	1,000	0.82 U	4.1 U	44.3 U	2.69 U	0.82 U	1,460 U	0.82 U
3-Chloropropene	NS	16	0.626 U	3.13 U	33.8 U	2.05 U	0.626 U	1,120 U	0.626 U
4-Ethyltoluene	NS	NS	0.983 U	4.92 U	53.1 U	3.22 U	0.983 U	1,760 U	0.983 U
4-Methyl-2-pentanone	NS	100,000	2.05 U	10.3 U	110 U	6.72 U	2.05 U	3,660 U	2.05 U
Acetone	NS	1,100,000	24.5	22.5	128 U	57	25.2	4,250 U	4.37
Benzene	NS	12	10.6	21.3	34.5 U	11.9	3.99	1,140 U	0.649
Benzyl chloride	NS	1.9	1.04 U	5.18 U	55.9 U	3.4 U	1.04 U	1,850 U	1.04 U
Bromodichloromethane	NS	2.5	1.34 U	6.7 U	72.4 U	4.39 U	1.34 U	2,390 U	1.34 U
Bromoform	NS	85	2.07 U	10.3 U	112 U	6.78 U	2.07 U	3,690 U	2.07 U
Bromomethane	NS	170	0.777 U	3.88 U	41.9 U	2.55 U	0.777 U	1,390 U	0.777 U
Carbon disulfide	NS	24,000	0.766	3.11 U	33.6 U	2.22	0.807	1,110 U	0.623 U
Carbon tetrachloride	6	16	1.26 U	6.29 U	67.9 U	4.13 U	1.26 U	2,250 U	1.26 U
Chlorobenzene	NS	1,700	0.921 U	4.61 U	49.7 U	3.02 U	0.921 U	1,640 U	0.921 U
Chloroethane	NS	350,000	0.528 U	2.64 U	28.5 U	1.73 U	0.528 U	942 U	0.528 U
Chloroform	NS	4.1	1.39	10.5	52.7 U	3.2 U	0.977 U	1,740 U	0.977 U
Chloromethane	NS	3,100	0.413 U	2.07 U	22.3 U	1.35 U	0.413 U	737 U	0.987
cis-1,2-Dichloroethene	6	NS	0.793 U	3.96 U	42.8 U	2.6 U	0.793 U	1,420 U	0.793 U
cis-1,3-Dichloropropene	NS	23	0.908 U	4.54 U	49 U	2.98 U	0.908 U	1,620 U	0.908 U
Cyclohexane	NS	210,000	1.1	84.3	375	47.2	1.68	1,230 U	0.688 U
Dibromochloromethane	NS	NS	1.7 U	8.52 U	92 U	5.59 U	1.7 U	3,040 U	1.7 U
Dichlorodifluoromethane	NS	3,500	1.86	4.94 U	53.4 U	3.24 U	2.11	1,770 U	2
Ethanol	NS	NS	26	47.3 U	507 U	30.9 U	41.1	16,800 U	9.42 U
Ethyl Acetate	NS	2,400	1.8 U	9.05 U	96.9 U	5.91 U	1.8 U	3,220 U	1.8 U
Ethylbenzene	NS	37	1.29	4.34 U	46.9 U	2.85 U	1.14	1,550 U	0.869 U
Freon-113	NS	170,000	1.53 U	7.66 U	82.8 U	5.03 U	1.53 U	2,740 U	1.53 U
Freon-114	NS	NS	1.4 U	6.99 U	75.5 U	4.59 U	1.4 U	2,500 U	1.4 U
Heptane	NS	NS	2.47	185	44.3 U	41.4	2.8	1,460 U	0.82 U
Hexachlorobutadiene	NS	4.3	2.13 U	10.7 U	115 U	7 U	2.13 U	3,810 U	2.13 U
Isopropanol	NS	7,000	197	127	165	150	79.4	2,200 U	6.46
Methyl tert butyl ether	NS	360	0.721 U	3.61 U	38.9 U	2.37 U	0.721 U	1,290 U	0.721 U
Methylene chloride	100	3,400	1.74 U	8.72 U	93.5 U	5.7 U	1.74 U	3,100 U	1.74 U
n-Hexane	NS	24,000	3.7	529	214	223	7.68	1,260 U	0.705 U
o-Xylene	NS	3,500	1.51	4.34 U	46.9 U	2.85 U	1.33	1,550 U	0.869 U
p/m-Xylene	NS	3,500	4.21	8.73 U	93.8 U	5.69 U	3.71	3,100 U	1.74 U
Styrene	NS	35,000	0.852 U	4.26 U	46 U	2.79 U	0.852 U	1,520 U	0.852 U
Tertiary butyl Alcohol	NS	NS	19.2	11.3	81.5 U	4.97 U	6.12	2,710 U	1.52 U
Tetrachloroethene	100	360	1.36 U	6.78 U	73.2 U	4.45 U	1.36 U	2,420 U	1.36 U
Tetrahydrofuran	NS	70,000	1.47 U	7.4 U	79.3 U	4.84 U	1.47 U	2,630 U	1.47 U
Toluene	NS	170,000	9.87	27.1	40.7 U	12.7	9.99	1,350 U	1.3
trans-1,2-Dichloroethene	NS	NS	0.793 U	3.96 U	42.8 U	2.6 U	0.793 U	1,420 U	0.793 U
trans-1,3-Dichloropropene	NS	23	0.908 U	4.54 U	49 U	2.98 U	0.908 U	1,620 U	0.908 U
Trichloroethene	6	16	1.07 U	5.37 U	58 U	3.53 U	1.07 U	1,920 U	1.07 U
Trichlorofluoromethane	NS	NS	1.12 U	5.62 U	60.7 U	3.69 U	7.19	2,010 U	1.12 U
Vinyl bromide	NS	2.9	0.874 U	4.37 U	47.2 U	2.87 U	0.874 U	1,560 U	0.874 U
Vinyl chloride	6	5.6	0.511 U	2.56 U	27.6 U	1.68 U	0.511 U	913 U	0.511 U

Notes:

(1) New York DOH Matrix A,B,C Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.

(2) EPA VISL Default Residential Target Sub-Slab & Exterior Soil Gas Concentrations Criteria per VISL Calculator, Version 3.5, Updated October 2017 (June 2017 RSLs).

bgs- below ground surface

U - The analyte was analyzed for, but was not detected above the reported sample quantification limit.

Highlighted values indicate detectable concentration of compound

Highlited values indicae detecatable conentration in exceedance of EPA VISL

APPENDIX A – LIST OF SITE CONTACTS

Name	Phone/Email Address
Avi Fisher, 204 4th Avenue, LLC, Remedial Party	646-828-3588, avi@averyhallinvestments.com
Erik Dee-Olsen, PWGC, Remedial Engineer	631-589-6353, edee-olsen@pwgrosser.com
Ryan Morley, PWGC Project Manager	631-589-6353, RyanM@pwgrosser.com
Steven Wu, NYSDEC Project Manager	718-482-6725, Steven.Wu@dec.ny.gov
Andre Obligado, NYSDEC Section Chief	718-482-6725, andre.obligado@dec.ny.gov
Kelly Lewandowski, NYSDEC, Site Control	518-402-9553, kelly.lewandowski@dec.ny.gov
Daniel Tucholski, NYSDOH Project Manager	518-486-7016, Daniel.Tucholski@health.ny.gov
David Yudelson, Sive, Paget & Riesel P.C., Remedial Party's Attorney	917-295-6449, Dyudelson@sprlaw.com

APPENDIX B – EXCAVATION WORK PLAN (EWP)

B-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. The Table below includes contact information for the above notification. The information on this Table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in **Appendix A**.

Table: Notifications*

Andre Obligado NYSDEC Section Chief	718-482-6725, andre.obligado@dec.ny.gov
Steven Wu NYSDEC Project Manager	718-482-6725, Steven.Wu@dec.ny.gov
Kelly Lewandowski NYSDEC Site Control	518-402-9553, kelly.lewandowski@dec.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, 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 of professional seals and alterations.

B-2 SOIL SCREENING METHODS

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

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

B-3 SOIL STAGING METHODS

A qualified environmental professional or person under their supervision will oversee invasive work and the excavation and load-out of excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for the safe execution of 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.

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 other applicable transportation requirements).

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

Soil stockpiles 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.

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

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

B-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.

B-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:

- Exit the Site and head north on Fourth Avenue.
- Turn left (west) onto Atlantic Avenue for one block.
- Turn right (north) onto Third Avenue for 2 blocks.
- Turn left (northwest) onto Flatbush Avenue for approximately one mile.
- Turn right (east) onto the on-ramp for I-278/Brooklyn-Queens Expressway.

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 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.

B-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 Use 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).

B-7 MATERIALS REUSE ON-SITE

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

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior

approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances 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 Section B-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.

B-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.

B-9 COVER SYSTEM RESTORATION

After the completion of soil removal and 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 approximately 8-12 inches thick. Restoration will include repairing the slab to match the pre-existing thickness. A figure showing the restored surface will be included in the subsequent PRR and in an updated SMP.

B-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found 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 included as **Appendix K**.

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

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

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

B-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 which becomes damaged due to weathering.

Erosion and sediment control measures identified in this 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.

B-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 discovered will be closed 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 PRR.

B-13 COMMUNITY AIR MONITORING PLAN

A figure showing the location of air sampling stations based on generally prevailing wind conditions will be provided prior to performance of soil disturbing activities. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

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

B-13A: Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

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

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

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter (ug/m^3), work activities should be

suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 ug/m^3 or less at the monitoring point.

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

B-13B: Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated under the "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" Section B-13A above, except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

B-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 excavations, use of tarping, hydromulch, or encapsulant to cover soils during excavations, direct loading of soils, use of chemical odorants, piping discharge SSDS air outside and away from occupied areas, use of vapor phase carbon units to filter air, and monitoring air at and beyond property lines. 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 Remedial Engineer, and any measures that are implemented will be discussed in the PRR.

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

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

B-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section B-13. If particulate levels at the Site exceed the thresholds listed in the CAMP or if airborne dust is observed on the Site or leaving the Site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the Site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.

- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

B-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 remedial work.

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

Attached on the following page are Appendix 1-A (Generic CAMP) and Appendix 1-B (Fugitive Dust and Particulate Monitoring) from DER-10.

APPENDIX C
RESPONSIBILITIES of
OWNER and REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the 204 4th Avenue site (the "Site"), Site No. C224295, are divided between the site owners and the Remedial Party, as defined below. The owners is/are currently listed as:

- 204 4th Avenue, LLC (the "Owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

- 204 4th Avenue, LLC (the "Remedial Party")

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the Site.

Site Owner's Responsibilities:

1) The Owner shall follow the provisions of the SMP as they relate to future construction and excavation at the Site.

2) In accordance with a periodic time frame determined by the NYSDEC, the Owner shall periodically certify, in writing, that Institutional Controls set forth in the Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the Site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the Site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The Owner shall grant access to the Site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The Owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the Owner shall notify the Site's RP and the NYSDEC in accordance with the timeframes indicated in the Notifications Section of this SMP.

6) If some action or inaction by the Owner adversely impacts the Site, the owner must notify the Site's RP and the NYSDEC in accordance with the time frame indicated in the Notifications Section of this SMP and coordinate the performance of necessary corrective actions with the RP.

7) The Owner must notify the RP and the NYSDEC of any potential changes in ownership of the Site property (identifying the tax map numbers in correspondence) and provide contact information for the new owner of the Site property. 6 NYCRR Part 1.11(d) contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, any activity that may increase direct human or environmental exposure (e.g., day care, school or park). A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the Owner shall operate such system, pay the utility invoices for the system's operation, and report maintenance issues to the RP and the NYSDEC.

9) In accordance with the tenant notification law, within 15 days of receipt, the Owner must supply a copy of any vapor intrusion data that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the Site, whether produced by the NYSDEC, RP, or Owner, to the tenants on the property. The Owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation that it undertakes at the Site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, Periodic Review Reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the Site property to undertake a specific activity, the RP shall provide the Owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the Owner, upon the Owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the Owner(s).

5) The RP shall notify the NYSDEC and the Owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under the Notifications Section of the SMP.

7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in the SMP.

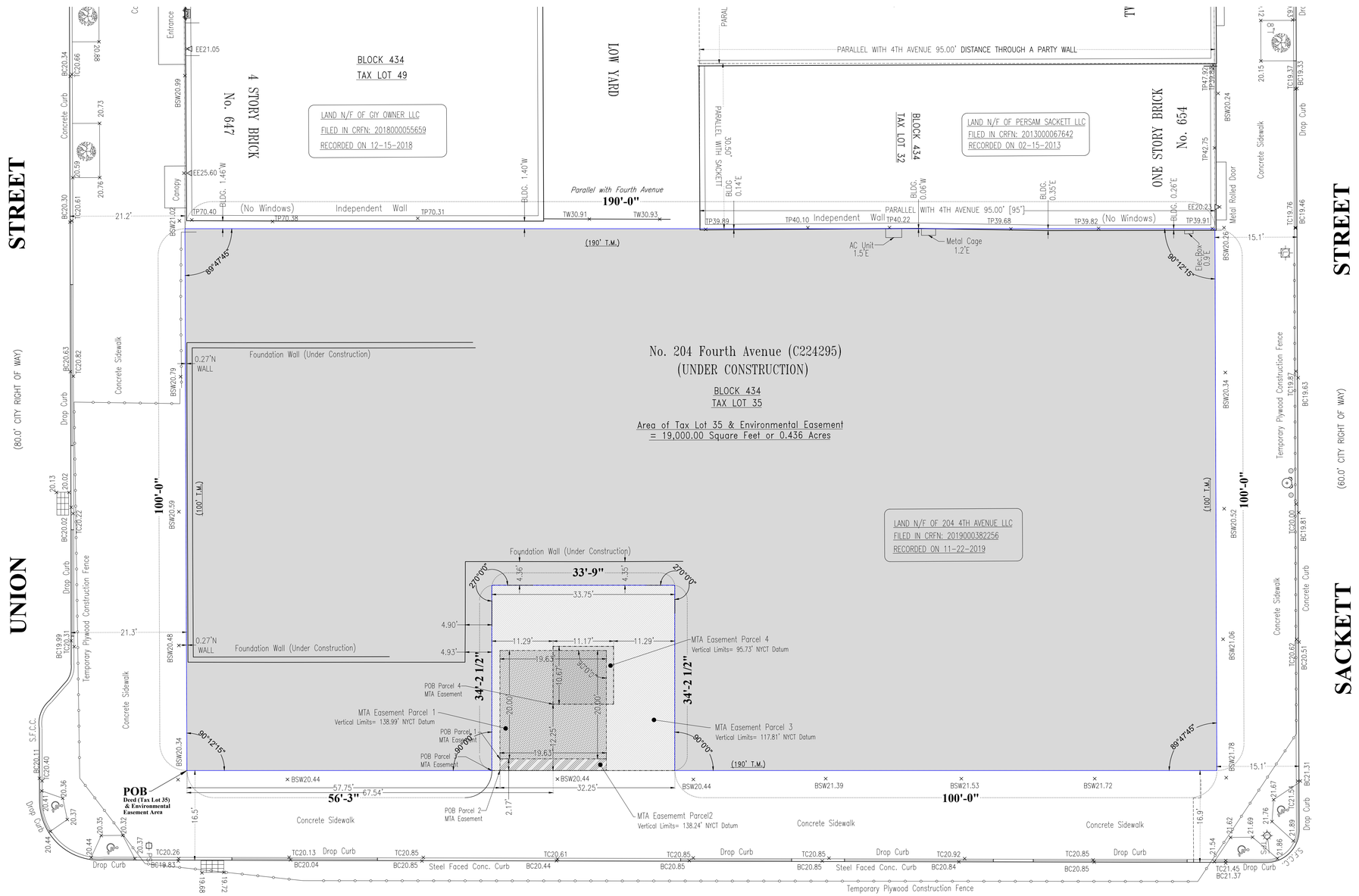
8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the Site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control does not affect the RP's obligations with respect to the Site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

APPENDIX D – ENVIRONMENTAL EASEMENT



6.096 0 3.048 6.096 12.192 24.384

20 0 10 20 40 80

1 inch = 6.096 m. / 1 inch = 20 Feet

North

Map Amendments

NO.	DATE	DESCRIPTION	DRWN BY	APPROV. BY
1.	11-30-23	REVISED TRACK 4 METES AND BOUNDS	DRWN BY	APPROV. BY

Linetypes

GAS LINE — SEWER LINE
CABLE LINE — STEAM LINE
TELEPHONE LINE — TRAFFIC STRIPE
ELECTRIC LINE — NYC R.O.W.
WATER LINE — PROPERTY LINE
CHAIN LINK FENCE

NYS Department of Environmental Conservation Notes:

"This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov".

Legal Description - Tax Lot 35

ALL THAT CERTAIN plot, piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the northerly side of Union Street and the westerly side of Fourth Avenue;

RUNNING THENCE northerly along said westerly side of Fourth Avenue, 190 feet to the corner formed by the intersection of the southerly side of Sackett Street and the westerly side of Fourth Avenue;

THENCE westerly along the southerly side of Sackett Street, 100 feet;

THENCE southerly, parallel with Fourth Avenue, 190 feet to a point on the northerly side of Union Street;

THENCE easterly along said northerly side of Union Street, 100 feet to the point or place of BEGINNING

Land Area = 19,000.00 sq.ft. or 0.436 Acres

Legal Description
Track 4 Environmental Easement Area
(Part of Tax Lot 35)

ALL THAT CERTAIN plot, piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the northerly side of Union Street and the westerly side of Fourth Avenue;

RUNNING THENCE northerly along said westerly side of Fourth Avenue, 56 feet 3 inches to a point;

THENCE westerly, forming in interior angle of 90 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 34 feet 2 ½ inches to a point;

THENCE northerly, forming in interior angle of 270 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 33 feet 9 inches to a point;

THENCE easterly, forming in interior angle of 270 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 34 feet 2 ½ inches to a point along the westerly side of Fourth Avenue;

THENCE northerly, running along said westerly side of 4th Avenue and forming in interior angle of 90 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 100 feet 0 inches to the south west corner of the intersection of Fourth Avenue and Sackett Street ;

THENCE westerly, along the southerly side of Sackett Street, a distance of 100 feet 0 inches to a point;

THENCE southerly, forming an interior angle of 90 degrees 12 minutes 15 seconds with the last mentioned course and parallel to Fourth Avenue, a distance of 190 feet to a point along the northerly side of Union Street;

THENCE easterly, running along said northerly side of Union Street, a distance of 100 feet 0 inches to the point and place of BEGINNING.

Land Area = 17,845.41 sq.ft. 0.4097 Acres

Flood Note

By graphic plotting only, this property lies in Zone X of the Flood Insurance Rate Map, Community Panel No. 3604970211F, which bears the effective date of September 5, 2007, the current flood map, and IS NOT in a Special Flood Hazard Area.

Zone X are areas determined to be outside the 0.2% annual chance flood plan.

nycls
New York City Land Surveyors, PC
63 Montgomery Avenue, S.I., NY 10301
Phone: 718-816-8182 Fax: 718-816-8124
www.nycsurveyors.com

Client: NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION

Map of Survey of Property
in the
County of Kings
Borough of Brooklyn
City of New York

Site Address:
204 FOURTH AVENUE
BROOKLYN, NY 11215

Block: 434 / Lot(s): 35

TAx Lot 35 Area: 19,000.00 sq.ft. (0.4361 Acres)
Track 4 Area: 17,845.41 sq.ft. (0.4097 Acres)

Project Number:	2022-29-434K
Survey Date:	02-21-2023
Survey Title:	NYS DEC EASEMENT SURVEY
Scale:	1"=20'
Drawn By:	J.D. / Approved By: P. Jones

Surveyors Certificate

To:

New York State Department of Environmental Conservation:

This is to certify that this survey was prepared in accordance with the existing code of practice for land surveys, adopted by the New York State Association of Professional Land Surveyors, and said certification shall run only to the person for whom the survey was prepared, and on his/her behalf to the title company, governmental agency and lending institution listed hereon, and to the assignee of the lending institution, certifications are not transferable to additional institutions or subsequent owners.

Date of Plat or Map: February 21, 2023

Patrick B. Jones
New York State Licensed Land Surveyor
License # 050624

LICENSED LAND SURVEYOR 050624

Abbreviations

TOP OF CURB ELEVATION	× TC13.29
BOTTOM OF CURB ELEVATION	× BC13.29
TOP OF WALL ELEVATION	× TW13.29
BASE OF ROOF ELEVATION	× R13.29
TOP OF VENT ELEVATION	× TV13.29
TOP OF PARAPET ELEVATION	× TP13.29
SPOT ELEVATION	× 13.29
BLDG.	BUILDING
BM	BENCHMARK
C.C.	CONCRETE CURB
CL	CENTERLINE
C.L.F.	CHAIN LINK FENCE
CONC.	CONCRETE
CRFN.	CITY REGISTER FILE NUMBER

Abbreviations

C.W.	CONCRETE WALL
D.C.	DROP CURB
ELEC.	ELECTRIC
F.R.P.	FROM RECORD PLAN
FL.	FLOOR
I.F.	IRON FENCE
MON.	MONUMENT
M.B.P.O.	MANHATTAN BOROUGH PRESIDENTS OFFICE
R.O.W.	RIGHT OF WAY
S.F.C.	STEEL FACE CURB
T.M.	TAX MAP
T.P.	TREE PIT
T.V.	TITLE VESTED
TW	TOP OF WALL ELEVATION

Legend of Symbols

ENTRANCE ELEVATION	◁ EE 13.29
CELLAR ENTRANCE ELEVATION	◁ CE 13.29
GARAGE ENTRANCE ELEVATION	◁ GE 13.29
UNKNOWN UTILITY MANHOLE	U
WATER MANHOLE	W
ELECTRIC MANHOLE	E
SEWER MANHOLE	S
VENT PIPE	V
MONITORING VALVE	MV
FIRE HYDRANT (LOW PRESSURE)	
GAS VALVE	GV
OIL FILL	OF
WATER VALVE	WV
SPOT ELEVATION	×13.29
PARKING METER (MUNI-METER)	PM

Legend of Symbols

MISCELLANEOUS TRAFFIC SIGN	TS
BOLLARD	
ENTRANCE ELEVATION	◀ EE 13.29
LEGAL GRADE/ ACTUAL GRADE FROM FINAL MAP	[72.88] NAVD88
LEGAL GRADE INTERPOLATED	(72.88) NAVD88 INT.
UNDERGROUND UTILITY VAULT	E
NYCDOT TRAFFIC SIGN	TS
ELECTRIC UTILITY BOX	E
METAL LIGHT POLE w/ PEDESTRIAN SIGNAL	
STANDPIPE/ SIAMESE CONNECTION (GROUND)	
STANDPIPE/ SIAMESE CONNECTION (WALL-MOUNTED)	
TAX BLOCK NUMBER	BLOCK 1027
TAX LOT NUMBER	TAX LOT 35
TREE	
TRAFFIC DIRECTION (ONE-WAY/ TWO-WAY)	

Legend of Symbols

ANCHOR	
CABLE TV IRON	C
CAMERA SECURITY	
CATCH BASIN	
COAL CHUTE	
DEPRESSED CURB (DC)	
DRAIN INLET	
FIRE HYDRANT (HIGH PRESSURE)	
FIRE CALL BOX	
HANDICAP	
GUY WIRE (TENSION CABLE FOR VERTICAL POLE)	
GAS MANHOLE	G
MAILBOX	MB
MONITORING WELL	
N.Y.F.D.	F

Miscellaneous Notes:

1. NOT RESPONSIBLE FOR THE LOCATION FOR ANY UNDERGROUND STRUCTURES, VAULTS, TANKS OR OTHER APPURTENANCES. THE USER OF THIS SURVEY SHOULD BE AWARE THAT WRITTEN AND UNWRITTEN EASEMENTS MAY GIVE OTHERS RIGHTS WHICH MAY AFFECT THE USE OF THIS PROPERTY.
2. UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB-DIVISION 2, OF THE NEW YORK STATE EDUCATION LAW.
3. "COPIES FROM THE ORIGINAL OF THIS SURVEY MAP NOT MARKED WITH AN ORIGINAL OF THE LAND SURVEYOR'S INKED SEAL OR HIS EMBOSSED SEAL SHALL NOT BE CONSIDERED A VALID TRUE COPY."
4. THE LEGAL GRADES SHOWN ON THIS MAP WERE TAKEN FROM THE BROOKLYN BOROUGH SECTIONAL / ALTERATION MAPS. LEGAL GRADES REFER TO TOP OF CURB.

Miscellaneous Notes:

5. ALL ELEVATIONS NOTED ON THIS SURVEY ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 AS ESTABLISHED AND MAINTAINED BY THE NATIONAL GEODETIC SURVEY OF THE NATIONAL OCEAN SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION OR SUCCESSOR AGENCY, WHICH IS HEREBY ESTABLISHED AS THE CITY DATUM BY LOCAL LAW 96 OF 2013.
6. THE OFFSETS AND DIMENSIONS SHOWN FROM THE STRUCTURES TO THE PROPERTY LINES ARE FOR A SPECIFIC PURPOSE AND USE AND THEREFORE ARE NOT INTENDED TO GUIDE THE ERECTION OF STRUCTURES AND ANY OTHER CONSTRUCTION.
7. BEFORE PERFORMING ANY EXCAVATION OR DRILLING ON THIS SITE, IT IS REQUIRED THAT SUBSURFACE SERVICE, INCLUDING THE UNDERGROUND MAINS, DUCTS, AND CABLES BE MARKED AND IDENTIFIED BY THE UTILITY COMPANY OR AGENCY INVOLVED, THIS SHOULD BE DONE BY PROVIDING THE AFFECTED UTILITY WITH THE NOTICE REFERRED TO IN THE STATE OF NEW YORK INDUSTRIAL CODE 53.
8. CERTIFICATIONS ON THIS BOUNDARY SURVEY MAP SIGNIFY THAT THE MAP WAS PREPARED IN ACCORDANCE WITH THE CURRENT EXISTING CODE OF PRACTICE FOR LAND SURVEYS ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS, INC.

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

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

2023121100213001001EF5BA

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

Document ID: 2023121100213001 Document Date: 12-07-2023 Preparation Date: 12-11-2023
Document Type: EASEMENT
Document Page Count: 9

PRESENTER:
SIVE PAGET & RIESEL, P.C.
560 LEXINGTON AVENUE, 15TH FLOOR
NEW YORK, NY 10022
212-421-2150
NDUNCAN@SPRLAW.COM

RETURN TO:
SIVE PAGET & RIESEL, P.C.
560 LEXINGTON AVENUE, 15TH FLOOR
NEW YORK, NY 10022
212-421-2150
NDUNCAN@SPRLAW.COM

PROPERTY DATA

Borough	Block	Lot	Unit	Address
BROOKLYN	434	35	Partial Lot	204 4 AVENUE

Property Type: NON-RESIDENTIAL VACANT LAND Easement

CROSS REFERENCE DATA

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

PARTIES

GRANTOR/SELLER:
204 4TH AVENUE LLC
C/O: AVERY HALL INVESTMENTS, 497 CARROLL STREET, 6TH FLOOR
BROOKLYN, NY 11215

GRANTEE/BUYER:
PEOPLE OF NEW YORK BY DEPT. ENVIRONMENTAL CONSERVA
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 12-18-2023 16:30
City Register File No.(CRFN): **2023000329009**

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 7th day of December, 2023 between Owner, 204 4th Avenue LLC, a Delaware limited liability company, having an office at c/o Avery Hall Investments, 497 Carroll Street, Suite 61, Brooklyn, New York 11215 (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 204 4th Avenue in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as a portion of tax map parcel number: Block 434 Lot 35, being the same as that property conveyed to Grantor by deed dated as of November 14, 2019 and recorded in the City Register of the City of New York as CRFN #2019000382256. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.410 +/- acres, and is hereinafter more fully described in the Land Title Survey dated February 21, 2023 (as revised on November 30, 2023) prepared by Patrick B. Jones (License # 050624), New York City Land Surveyors, PC, 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 Number: C224295-07-19, 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 New York State Department of Health ("NYSDOH") or the New York City Department of Health and Mental Hygiene ("NYCDOHMH") to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

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

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

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

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

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

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

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

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

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

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

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

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

Law.

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

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

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

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

(i) are in-place;

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

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

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

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

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

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

(7) the information presented is accurate and complete.

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

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

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

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against

the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

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

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

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

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

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

Parties shall address correspondence to:

Site Number: C224295
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.

204 4th Avenue LLC:

By: _____

Print Name: Avishy Fisher

Title: Authorized Signatory Date: 12/6/2023

Grantor's Acknowledgment

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

On the 6 day of Dec, in the year 2023, before me, the undersigned, personally appeared Avishy Fisher, 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.

Charles E Segure

Notary Public - State of New York

CHARLES E. SEGURE, JR.
Notary Public - State Of New York
No. 01SE6136197
Qualified in Kings County
My Commission Expires November 21, 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 O. Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the 7th 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.

_____
Notary Public - State of New York

Cheryl A. Salem
Notary Public State of New York
Registration No. 01SA0002177
Qualified in Albany County
My Commission Expires March 3, 2027

SCHEDULE "A" PROPERTY DESCRIPTION

Legal Description: Environmental Easement Area
204 4th Avenue (C224295)

BOROUGH OF BROOKLYN, BLOCK: 434, LOT: 35

Environmental Easement Area (Part of Tax Lot 35):

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

BEGINNING at the corner formed by the intersection of the northerly side of Union Street and the westerly side of Fourth Avenue;

RUNNING THENCE northerly along said westerly side of Fourth Avenue, 56 feet 3 inches to a point;

THENCE westerly, forming an interior angle of 90 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 34 feet 2 ½ inches to a point;

THENCE northerly, forming an interior angle of 270 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 33 feet 9 inches to a point;

THENCE easterly, forming an interior angle of 270 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 34 feet 2 ½ inches to a point along the westerly side of Fourth Avenue;

THENCE northerly, running along said westerly side of 4th Avenue and forming an interior angle of 90 degrees 0 minutes 0 seconds with the last mentioned course, a distance of 100 feet 0 inches to the south west corner of the intersection of Fourth Avenue and Sackett Street;

THENCE westerly, along the southerly side of Sackett Street, a distance of 100 feet 0 inches to a point;

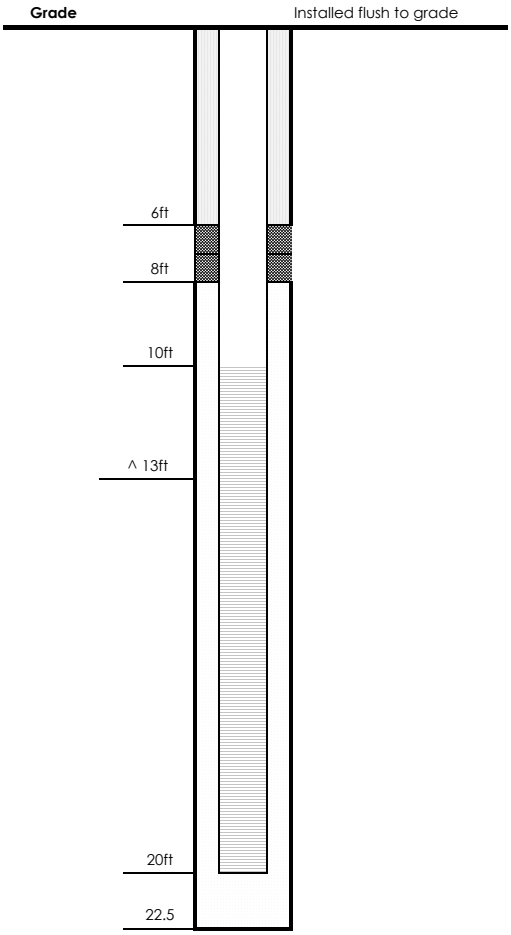
THENCE southerly, forming an interior angle of 90 degrees 12 minutes 15 seconds with the last mentioned course and parallel to Fourth Avenue, a distance of 190 feet to a point along the northerly side of Union Street;

THENCE easterly, running along said northerly side of Union Street, a distance of 100 feet 0 inches to the point and place of BEGINNING.

Land Area = 17,845.41 sq. ft. or 0.4097 acres

APPENDIX E – Monitoring Well Construction Logs

MW Designation:	**MW001**	**Logged By:**	Matthew Sanchez
Site Address:	204 4th Avenue, Brooklyn, NY	**Project Manager:**	Ryan Morley
Project Name:	AHI2005	**PWGC Project Number:**	AHI2005
Drilling Contractor:	AARCO Environmental Services	**Driller Name:**	NA
Drilling Method:	Hollow Stem Auger	**Borehole Diameter:**	4.125"
Soil Sampling Method:	N/A	**Total Borehole Depth (bls):**	22.5
Drilling Fluid:	N/A	**Fluid Loss During Drilling:**	N/A
Start Time:	7:35	**Completion Time:**	10:45
Start Date:	26-Mar-23	**Completion Date:**	26-Mar-03



Legend:

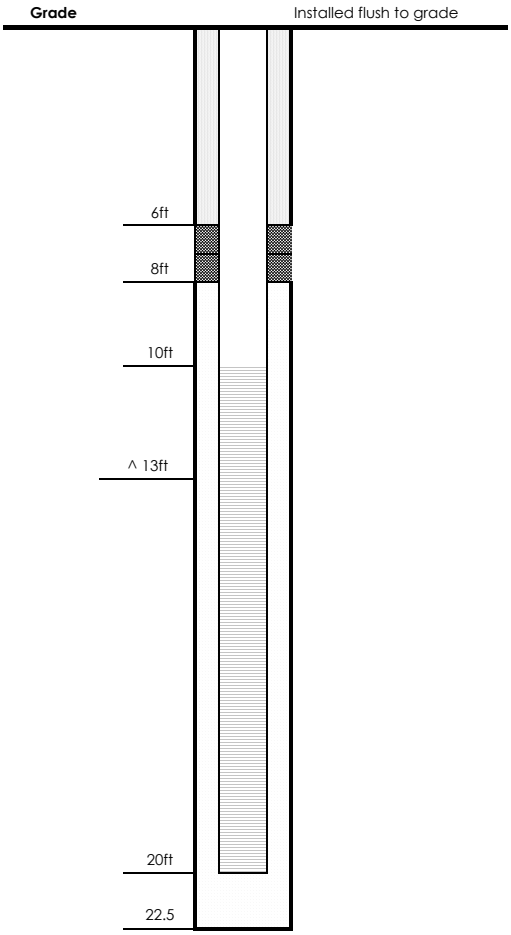
- #2 sand filter pack
- bentonite pellets
- native fill
- bentonite / cement grout
- well screen
- well riser
- ^ water table

Notes:

bls = below level surface

bmp = below measuring point

MW Designation:	**MW002**	**Logged By:**	Matthew Sanchez
Site Address:	204 4th Avenue, Brooklyn, NY	**Project Manager:**	Ryan Morley
Project Name:	AHI2005	**PWGC Project Number:**	AHI2005
Drilling Contractor:	AARCO Environmental Services	**Driller Name:**	NA
Drilling Method:	Hollow Stem Auger	**Borehole Diameter:**	4.125"
Soil Sampling Method:	N/A	**Total Borehole Depth (bls):**	22.5
Drilling Fluid:	N/A	**Fluid Loss During Drilling:**	N/A
Start Time:	11:00	**Completion Time:**	15:15
Start Date:	26-Mar-23	**Completion Date:**	26-Mar-03



Legend:

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- bentonite pellets
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- well riser
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Notes:

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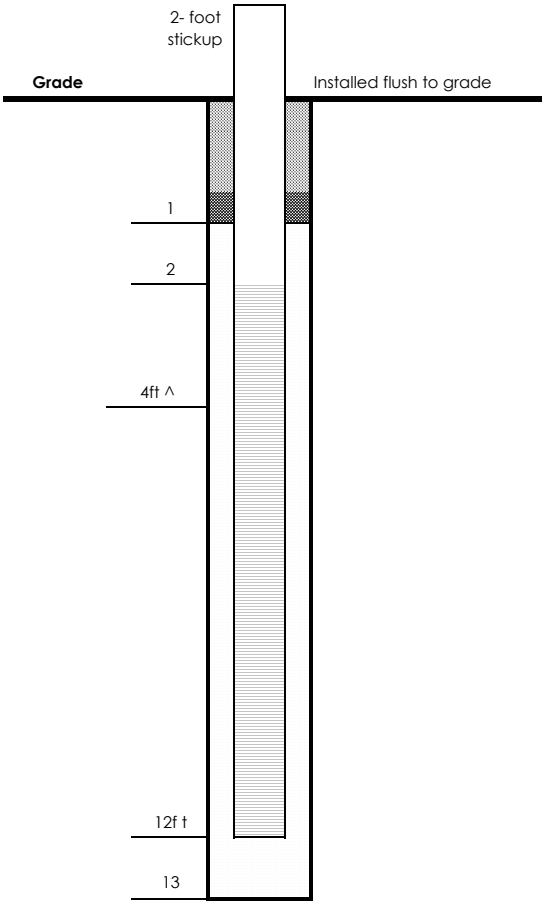
MW Designation:	**MW003**	**Logged By:**	Matthew Sanchez
Site Address:	204 4th Avenue, Brooklyn, NY	**Project Manager:**	Ryan Morley
Project Name:	AHI2005	**PWGC Project Number:**	AHI2005
Drilling Contractor:	AARCO Environmental Services	**Driller Name:**	NA
Drilling Method:	Hollow Stem Auger	**Borehole Diameter:**	4.125"
Soil Sampling Method:	N/A	**Total Borehole Depth (bls):**	12
Drilling Fluid:	N/A	**Fluid Loss During Drilling:**	N/A
Start Time:	7:00	**Completion Time:**	11:30
Start Date:	27-Mar-23	**Completion Date:**	27-Mar-03



Legend:

- #2 sand filter pack
- bentonite pellets
- native fill
- bentonite / cement grout
- well screen
- well riser
- ^ water table

Notes:

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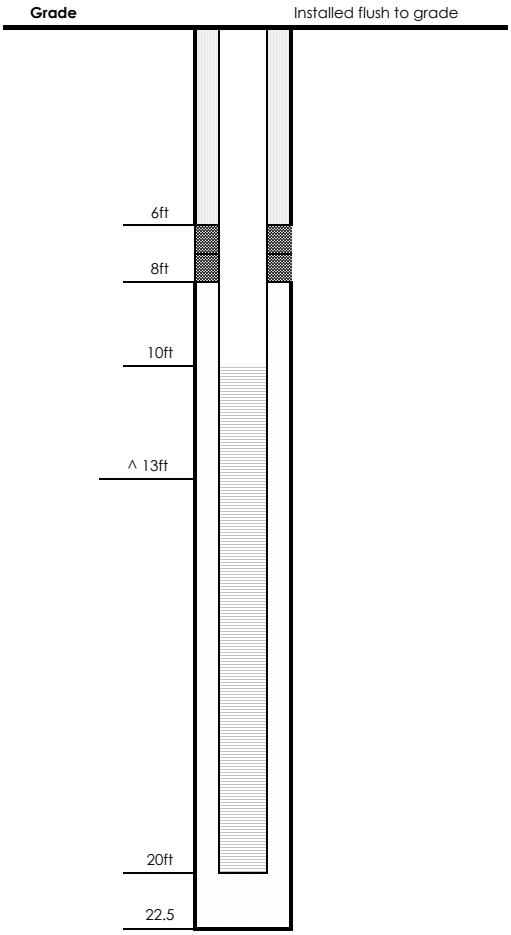
MW Designation:	**MW004**	**Logged By:**	Matthew Sanchez
Site Address:	204 4th Avenue, Brooklyn, NY	**Project Manager:**	Ryan Morley
Project Name:	AHI2005	**PWGC Project Number:**	AHI2005
Drilling Contractor:	AARCO Environmental Services	**Driller Name:**	NA
Drilling Method:	Hollow Stem Auger	**Borehole Diameter:**	4.125"
Soil Sampling Method:	N/A	**Total Borehole Depth (bls):**	22.5
Drilling Fluid:	N/A	**Fluid Loss During Drilling:**	N/A
Start Time:	11:00	**Completion Time:**	15:15
Start Date:	27-Mar-23	**Completion Date:**	27-Mar-03



Legend:

- #2 sand filter pack
- bentonite pellets
- native fill
- bentonite / cement grout
- well screen
- well riser
- ^ water table

Notes:

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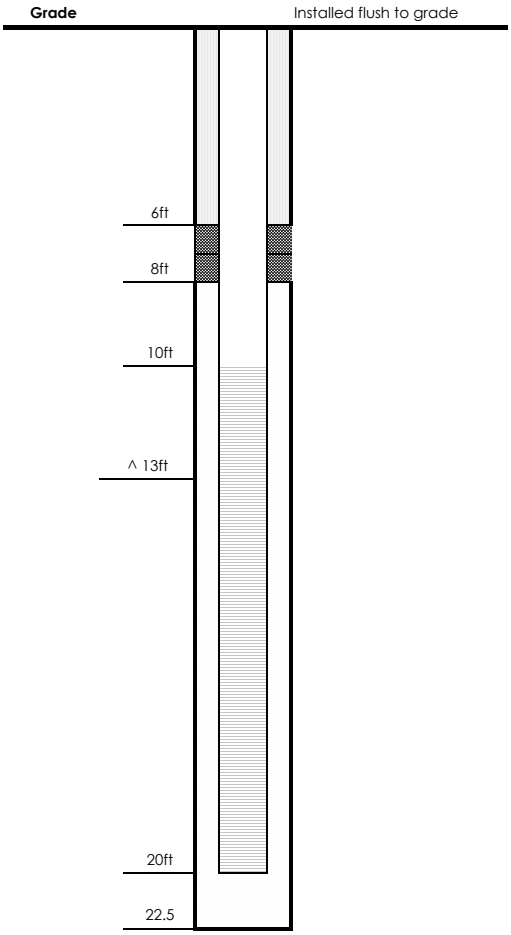
MW Designation:	**MW005**	**Logged By:**	Matthew Sanchez
Site Address:	204 4th Avenue, Brooklyn, NY	**Project Manager:**	Ryan Morley
Project Name:	AHI2005	**PWGC Project Number:**	AHI2005
Drilling Contractor:	Associated Environemtal Services	**Driller Name:**	NA
Drilling Method:	Hollow Stem Auger	**Borehole Diameter:**	4.125"
Soil Sampling Method:	N/A	**Total Borehole Depth (bls):**	22.5
Drilling Fluid:	N/A	**Fluid Loss During Drilling:**	N/A
Start Time:	7:30	**Completion Time:**	13:00
Start Date:	11-Jul-23	**Completion Date:**	11-Jul-23



Legend:

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- bentonite pellets
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- well screen
- well riser
- ^ water table

Notes:

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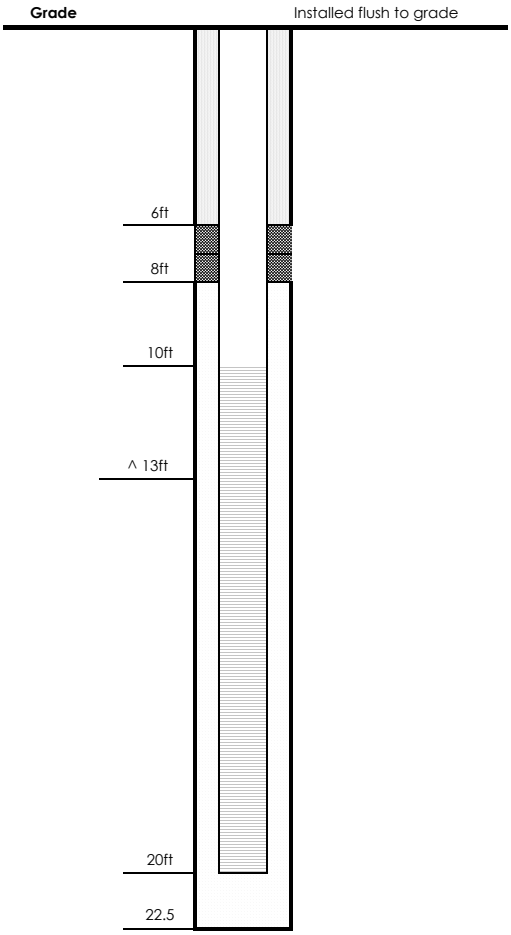
MW Designation:	**MW006**	**Logged By:**	Matthew Sanchez
Site Address:	204 4th Avenue, Brooklyn, NY	**Project Manager:**	Ryan Morley
Project Name:	AHI2005	**PWGC Project Number:**	AHI2005
Drilling Contractor:	Associated Environemtal Services	**Driller Name:**	NA
Drilling Method:	Hollow Stem Auger	**Borehole Diameter:**	4.125"
Soil Sampling Method:	N/A	**Total Borehole Depth (bls):**	22.5
Drilling Fluid:	N/A	**Fluid Loss During Drilling:**	N/A
Start Time:	7:30	**Completion Time:**	13:00
Start Date:	12-Jul-23	**Completion Date:**	12-Jul-23



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Notes:

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APPENDIX F – QUALITY ASSURANCE PROJECT PLAN

204 4TH AVENUE
BROOKLYN, NEW YORK 11217
NYSDEC BCP SITE: C224295
BLOCK: 434, LOT: 35

SITE MANAGEMENT PLAN
QUALITY ASSURANCE PROJECT PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

204 4th Avenue, LLC
51 East 12th Street, 7th Floor
New York, New York 10003

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

Ryan Morley, Project Manager RyanM@pwgrosser.com

PWGC Project Number: AHI2005

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204 4th AVENUE, BROOKLYN, NEW YORK
NYSDEC BCP ID C224295
QUALITY ASSURANCE PROJECT PLAN

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1.0 INTRODUCTION

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared this Quality Assurance Project Plan (QAPP) for post-remedial activities to be undertaken at the property located at 204 4th Avenue in Brooklyn, New York if necessary. This QAPP has been prepared to define the quality assurance (QA) and quality control (QC) measures to be implemented, to verify the integrity of the work to be performed at the site, and that the data collected will be of the appropriate type and quality needed for the intended use. Specifically, this QAPP addresses the following:

- Description of Project
- Organization and Responsibilities of Project Personnel
- Project Objectives, including Quality Assurance Objectives for Data
- Overview of Field Sampling Program and Procedures
- Sample Packaging and Shipping
- Sample Documentation
- Sample Analytical Program
- Quality Assurance/Quality Control Procedures

Post remedial activities, as specified in the Site Management Plan (SMP) for the site, may include:

- Monitoring well gauging and/or sampling
- Soil vapor and/or ambient air sampling.

2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

The monitoring efforts defined in the Site Management Plan (SMP) will be coordinated by PWGC on behalf of 204 4th, LLC. The New York State Department of Environmental Conservation (NYSDEC) is the lead regulatory agency overseeing monitoring and inspections at the site. An organization structure has been developed to identify the roles and responsibilities of the various parties involved with the project, as discussed below.

The **NYSDEC Project Manager** will be responsible for reviewing and approving work plans and amendments, coordinating approval of requested modifications, and providing guidance on regulatory requirements. The current NYSDEC Project Manager for this Site is Mr. Steven Wu.

The **Project Director** will provide technical expertise for review of the project plans, reports and ongoing field activities. The program manager will be responsible for the coordination of the overall post-BCP activities with the NYSDEC. The current project directors for this program will be Mr. Andy Lockwood.

The **Quality Assurance Manager** will be responsible for the Communicates changes to QAPP to NYSDEC and determines need for field and analytical corrective actions. The current quality assurance manager for this project is Ms. Jennifer Lewis.

The **Project Manager** will be responsible for the day-to-day project management, task leadership, and project engineering support and for the implementation of the SMP. The Project Manager is responsible for ensuring that the requirements of the remediation are implemented. The project manager will also act as the site Health and Safety Manager (HSM). The Project Manager for this is currently Mr. Ryan Morley

The **Field Team Leader** will be responsible for sample collection, oversight of subcontractor personnel, and coordination of field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan. The field team leader for this project is currently Mr. Dwight Chase.

Resumes for the Project Director, Quality Assurance Manager, Project Manager, and Field Team Leader are included in **Appendix Q-A**.

A NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation. The following analytical laboratories are designated for this site:

- Alpha Analytical of Westborough, Massachusetts – ELAP #11148
- York Analytical Laboratories of Stratford, Connecticut – ELAP #10854 and 12058

The following third-party data validator is designated for this site:

- Laboratory Data Consultants of Carlsbad, California (Company resume is included as **Appendix Q-B**)

Subcontractors will perform remedial construction, surveying, drilling, and/or sampling at the direction of the Field Team Leader in accordance with this work plan.

3.0 QUALITY ASSURANCE PROJECT OBJECTIVES

The objective of this QA/QC plan is to ensure proper and consistent inspection and sampling measures are performed during field activities during the continued monitoring phase for the duration of this SMP's lifespan.

3.1 Data Quality Objective Process

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions during routine monitoring activities. DQOs can be defined as what the end user expects to obtain from the analysis results, and are developed through a seven-step process:

- Step 1 State the problem
- Step 2 Identify the decision
- Step 3 Identify inputs to the decision
- Step 4 Define the study boundaries
- Step 5 Develop a decision rule
- Step 6 Specify limits on decision errors
- Step 7 Optimize the decision for obtaining data

For the site, screening data generated by rapid, less precise methods of analysis (PID screening, collection of groundwater field parameters, etc.) will achieve a data use level for site characterization and monitoring. Definitive laboratory analytical data generated during endpoint soil sampling will achieve a data use level to support an assessment of the overall effectiveness of the site remedy. Specifically, these data will be used to:

- Monitor the residual gasoline spill impact in groundwater beneath the site.
- Monitor sub-slab soil vapor and indoor air quality, if the SSDS is activated.

3.2 Data Quality Categories

DQOs are composed of written expectations for precision, accuracy, representativeness, completeness and comparability of a data set (see Section 3.3). The DQO process provides a logical basis for linking the QA/QC procedures to the intended use of the data, primarily through the decision maker's acceptable limits on decision error. Two descriptive data categories - screening data and definitive data - will be used for the site.

Screening data are generated by rapid, less precise methods of analysis and are deemed non-critical to project objectives. Portable instruments to be used during remedial action to collect screening data include:

- Photoionization detector (PID) or Flame ionization detector (FID)
- Aerosol/dust monitor

Definitive data are generated using specific analytical methods and guidelines and have satisfied known QA/QC requirements. Analytical data provided by an off-site laboratory shall be definitive data, and are deemed critical to project objectives. QA/QC elements of definitive data include determination and documentation of calibrations, detection limits, method blanks, and matrix spike recoveries.

3.3 QA/QC Characteristics

The overall QA/QC objective for remediation monitoring activities is to develop and implement procedures that will provide data of known and documented quality. QA/QC characteristics for data include precision, accuracy, representativeness, completeness, and comparability (PARCC). Data quality objectives for each of these parameters are determined based on the level of data required. Descriptions of these characteristics are provided below, and specific QA objectives for both screening and definitive data are presented in Table 3-1. Analytical matrices and methods are provided on the table for analysis that is anticipated to be performed during the SMP phase of the project and for analysis that are not anticipated.

Table 3-1
Laboratory Methods

ANALYTICAL METHODS (SOIL)

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
TAL Metals	Soil	EPA 6010C	1 x 2 oz, glass	Metals ex	6 months	6 months	12 to 24
TCL VOCs	Soil	EPA 8260C	3 x 40 ml VOA, glass vial	1 x Methanol 2 x DI H_2O Cool $\leq$ 6 °C	48 hours	14 Days	12 to 24
TCL SVOCs	Soil	EPA 8270D	1 x 8 oz, glass	Cool $\leq$ 6 °C	14 days	40 days	12 to 24
PCBs	Soil	EPA 8082A	1 x 8 oz, glass	Cool $\leq$ 6 °C	14 days	40 Days	12 to 24
Cyanide	Soil	EPA 9010C/9012B	1 x 250 ml, plastic	Cool $\leq$ 6 °C	14 days	14 days	12 to 24
PFAS	Soil	EPA 1633	1 x 8 oz, glass	None	14 days	28 days	12 to 24
*SIM Mode only necessary if EPA 8260 analysis cannot meet a MDL of 0.1 mg/kg							

ANALYTICAL METHODS (SOIL VAPOR)

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
VOCs	Soil Vapor	USEPA TO-15	6L SUMMA Canister	None	None	30	5

ANALYTICAL METHODS (GROUNDWATER)

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
Metals	Water	EPA 6020A	1 x 500 ml plastic	HNO_3	6 months	6 months	6
VOCs	Water	EPA 8260C	3 x 40 ml VOA, glass vial	HCl Cool $\leq$ 6 °C	48 hours	14 Days	6
SVOCs	Water	EPA 8270D	2 x 1000 ml, amber glass	Cool $\leq$ 6 °C	7 days	40 days	6
PCBs	Water	EPA 8082A	1 x 1000 ml, amber glass	Cool $\leq$ 6 °C	7 days	40 Days	6
Cyanide	Water	EPA 9010C/9012B	1 x 250 ml, plastic	NaOH	14 days	14 days	6
PFAS	Water	EPA 1633	3 x 250 ml HDPE, unlined cap	Trizma Cool < 6 °C	14 days	28 days	6
*SIM Mode to be used to meet required detection limit of 0.35 ug/L							

Notes:

Abbreviations include:

%R = Percent Recovery
GC = Gas Chromatography
N/A = Not Applicable
NTU = Nephelometric Turbidity Units
TAL = Target Analyte List
TCL = Target Compound List
CRQL = Contract Required Quantitation Limit
MDL = Method Detection Limit
VOCs = Volatile Organic Compounds
RPD = Relative Percent Difference

* Precision dependent on meter and scale.

Precision is the measurement of agreement in repeated tests of the same or identical samples, under prescribed conditions. Analytical precision can be expressed in terms of Standard Deviation (SD), Relative Standard Deviation (RSD) and/or Relative Percent Difference (RPD). The precision of analytical environmental samples has two components - laboratory precision and sampling precision. Laboratory precision is determined by replicate measurements of laboratory duplicates and by analysis of reference materials. The objectives for laboratory precision are specified in the analytical methodologies and are presented on Table 3-1. The precision of the field sampling effort is determined by the analysis of field duplicate samples. Field duplicate analysis will be performed at a rate of five percent (i.e., one duplicate collected for every 20 samples). Acceptance criteria for duplicates analyzed by an off-site laboratory shall be an RPD of 25 percent. The precision limits provided in Table 3-1 for the screening measurements are acceptance criteria for duplicate and calibration analyses of field measurement parameters.

Accuracy is the degree of agreement of a measured sample result or average of results with an accepted reference or true value. It is the quantitative measurement of the bias of a system, and is expressed in terms of percent recovery (%R). Measurements of accuracy for the laboratory include surrogate spike, laboratory control spike, matrix spike and matrix spike duplicate samples. The laboratory must meet or exceed control limit objectives, as stated in Table 3-1 and the applicable methodologies.

Representativeness is the degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled site areas. Representativeness of data will be ensured through the selection of sampling locations and implementation of approved sampling procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.

Completeness is defined as the percentage of samples that meet or exceed all the criteria objective levels for accuracy, precision and detection limits within a defined time period or event. It is the measure of the number of data "points" which are judged to be valid, usable results. The objective for completeness for this project is 90 percent, and will be calculated by dividing the number of usable data results (i.e., all results not considered to be "rejected" and all samples able to be analyzed) by the number of possible data results (i.e., the total number of field samples collected), and then multiplying by 100 percent.

Comparability is the degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory. See Table 3-1 and Section 6.0 for analysis methods and detection limits for this field investigation.

3.4 Impact of Failure to Meet Data Quality Objectives

The QA objectives presented in Table 3-1 represent the data quality necessary to meet the project's technical goals. The QA/QC efforts discussed in this QAPP focus on controlling measurement error, and ultimately providing a database for estimating the uncertainty in the measurement data for the project. QA objectives will be evaluated throughout the SMP monitoring effort to see if the results for the project meet the stated objectives. If these objectives are not being met, the precision and/or accuracy of the sampling data will be decreased, and corrective actions shall be taken, as documented in Section 13.0.

4.0 SITE MANAGEMENT MONITORING ACTIVITIES

This section provides an overview of the planned monitoring operations by matrix and type of procedures. It also includes activities that may be necessary in the future to supplement the existing groundwater monitoring well network (i.e., site survey; monitoring well installation, etc.). Field monitoring and sampling activities include the following:

- Mobilization and demobilization, if necessary.
- Waste Characterization, if necessary.
- Soil Excavation and Removal, if necessary.
- Monitoring well sampling.
- SSDS monitoring and sampling.

4.1 SMP Monitoring Procedures

SMP monitoring activities to be performed at the site will be conducted in accordance with established technical guidelines, methods, policies and Standard Operating Procedures (SOPs). The subsections below present an overview of the sampling program procedures; a more detailed discussion of the monitoring activities is presented in the SMP.

4.1.1 Mobilization and Demobilization

If necessary, he mobilization effort will consist of logistical planning, identification of sampling locations, equipment mobilization to the site, and field personnel orientation. The orientation meeting will familiarize the sampling team with a brief history of the site, health and safety requirements, and SMP monitoring procedures. Mobilization and demobilization will take place before and after completion of routine periodic SMP monitoring events. Demobilization will consist of site area clean-up, staging and inventory of monitoring-derived wastes, decontamination and demobilization of field equipment, and organization of monitoring records.

4.1.2 Waste Characterization

If impacted soils are to be excavated and removed from the site for disposal, waste characterization samples will be collected to allow for a disposal facility to be selected a waste approval granted prior to the start of excavation activities. Verification sampling procedures and frequency will be in accordance with the requirements of the prospective disposal facility.

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4.1.3 Soil Excavation and Removal

If necessary, soils will be excavated from the proposed excavation area utilizing an excavator and/or hand tools. Soils will be screened during excavation and stockpiled on site either adjacent to the work area or nearby an access area for the material to place into a truck for off-site disposal. Soils will be screened utilizing a photoionization detector (PID) capable of detecting the presence of VOCs. Soils exhibiting significantly elevated PID responses or odors may be segregated and stockpiled from other soils being excavated. Trees, shrubs and underbrush within the excavation area will be cleared and disposed of as necessary.

4.1.4 Monitoring Well Sampling

Prior to sampling, each well will be gauged with an electronic interface probe to measure the depth to water. Wells will be purged using a decontaminated submersible pump, peristaltic pump, Waterra pump, or similar, fitted with disposal polyethylene tubing under low flow conditions. During purging, the groundwater parameters pH, temperature, conductivity, oxygen reduction potential (ORP), turbidity, and dissolved oxygen will be monitored every three minutes with a Horiba U52 water quality instrument or similar. When measurements stabilize in accordance with the United States Environmental Protection Agency (USEPA) standard operating procedure EQASOP-GW001, purging will be deemed completed and the Horiba will be disconnected. The groundwater samples will then be collected directly from the tubing and placed in pre-cleaned laboratory supplied glassware and packed in a cooler on ice and delivered to a NYSDOH ELAP certified laboratory under chain-of-custody seal. The groundwater samples will be analyzed for CP-51 List VOCs per USEPA Method 8260 and CP-51 List SVOCs by USEPA Method 8270.

4.1.5 SSDS Monitoring and Sampling

If the SSDS is activated, observations (e.g., system component integrity, etc.) will be noted on the system performance log. The system performance log will serve as the inspection form for the SSDS, if activation is deemed necessary. If activated, vacuum readings will be collected from the permanent vapor monitoring points by temporarily replacing the point cover cap outfitted with a brass barb or equivalent. The barb will be outfitted with ¼ inch diameter tubing connected to a vacuum gauge and vacuum readings will be recorded in the system performance logs.

Soil vapor samples will be collected from the vapor monitoring points in accordance with NYSDOH guidance by creating a seal around the sampling location and inserting a tube into a laboratory provided SUMMA can sampler that extents into the sampling location. Ambient air samples will be collected with laboratory provided SUMMA cans as well. Soil vapor samples and ambient air samples will be collected for USEPA method TO-15 for VOCs.

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5.0 SAMPLE CUSTODY AND DOCUMENTATION

For samples collected from the site for laboratory analysis, a chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

Identification and documentation of samples are important in maintaining data quality. Strict custody procedures are necessary to ensure the integrity of the environmental samples. Sections below address sample identification, packaging, shipping, and documentation.

5.1 Sample Identification System

The method of identification of a sample depends on the type of measurement or analysis performed. When field screening measurements (e.g., pH, conductivity) are made, data are recorded directly in logbooks. Identifying information such as project name, sample location and depth, date and time, name of sampler, field observations, remarks, etc. shall be recorded.

Each sample collected for off-site laboratory analysis during the field investigation will be specifically designated by PWGC for unique identification. Samples will be identified using a letter code to indicate sample collection methodology. A letter code (see below) will follow, along with the name and/or number that identifies the specific location where the sample was collected. Field equipment blanks will be denoted by the letter code "FB" and trip blanks with "TB." Sample collection date and time will be recorded in the field logbook, chain of custody as well as the sample label.

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At a minimum, all location and identification information for the samples shall be recorded in the field sampling logbook, and on the appropriate chain of custody record form for shipment.

5.2 Sample Custody, Packaging and Shipping

Sample custody shall be strictly maintained and carefully documented each time sample material is collected, transported, received, prepared, and analyzed. Custody procedures are necessary to ensure the integrity of the samples, and samples collected during SMP monitoring activities must be traceable from the time the samples are collected until they are disposed of and/or stored, and their derived data are used in the subsequent monitoring report. Sample custody is defined as (1) being in the sampler's possession; (2) being in the sampler's view, after being in the sampler's possession; (3) being locked in a secured container, after being in the sampler's possession; and (4) being placed in a designated secure area.

5.2.1 Field Custody, Packaging and Shipping Procedures

Field custody procedures shall be implemented for each sample collected. The field sampler shall be responsible for the care and custody of the samples until they are properly transferred or dispatched. To maintain the integrity of the samples, the samples are to be stored in a designated, secure area and/or be custody sealed in the appropriate containers prior to shipment.

Each environmental sample will be properly identified and individually labeled. Labels will be filled out in indelible ink with at least the following information: sample identification (see Section 5.1), type and matrix of sample, date and time of sample acquisition, name of sampler, analysis required, and preservation (as necessary). The sample label will be securely attached to the sample container.

Environmental samples being analyzed by off-site laboratories will be properly packaged and shipped for analysis. Samples are to be packed with sufficient wet ice to cool the samples to 4^{o}C. Additionally, each cooler will be packed with a cooler temperature blank. Lastly, the cooler should be filled with adequate cushioning material to minimize the possibility of container breakage.

A laboratory supplied completed chain of custody form will be included with all sample shipments. When the samples are being shipped by an overnight delivery service to the laboratory, the chain of custody form and any other paperwork shall be checked against the sample labels and field documentation, and then placed in a waterproof sealable plastic bag and taped securely to the inside lid of the cooler. The cooler must then be secured,

with custody seals affixed over the lid opening in at least two locations, and the cooler wrapped with strapping tape (without obscuring the custody seals). Orientation "this end up" arrows shall be drawn or attached on two sides of the cooler, and a completed overnight delivery service shipping label shall be attached to the top of the cooler.

Samples to be shipped by an overnight delivery service shall be shipped within 24 hours of sample collection and arrive at the laboratory within 24 hours of sample shipment. A member of the field team will notify the laboratory of a sample shipment.

5.2.2 Laboratory Custody Procedures

The following generally summarizes laboratory custody procedures; more detailed operations are presented in the laboratory's SOPs.

- A designated sample custodian will accept custody of the shipped samples and will verify that the information on the sample labels matches that on the chain of custody record(s),
- The laboratory custodian will use the sample label number or assign a unique laboratory number to each sample label and will assure that all samples are transferred to the proper analyst or stored in the appropriate secure area; and,
- Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian or sample storage area. Internal chain of custody records shall be maintained by the laboratory.

The laboratory shall communicate with PWGC personnel by telephone, email or facsimile, as necessary, throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed. If a problem occurs during sample shipment or receipt (e.g., a sample container arrives broken or with insufficient sample volume, a sample was not preserved correctly, a sample was not listed on the chain of custody, etc.), the laboratory shall immediately notify the appropriate person for resolution.

Samples received by the laboratory will be retained until analyses and QA checks are completed. When sample analyses and necessary QA checks have been completed, the unused portion of the sample and the sample container must be disposed of properly by the laboratory. All identifying tags, data sheets, and laboratory records shall be retained as part of the permanent documentation.

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6.0 ANALYTICAL REQUIREMENTS

Analytical services will be provided by a NYSDOH ELAP approved laboratory. The laboratory will follow NYSDEC Analytical Sampling Protocol (ASP) and provide data in results only format, with the exception of the final round of sampling in which data will be reported with Category B deliverables (ASP-B). Analyses not available using ASP-B will be provided in results only format. Samples will be analyzes as follows:

6.1.1 Groundwater Samples

Groundwater samples collected from monitoring wells will be collected as described in the SMP. Each verification groundwater sample will be analyzed for CP-51 VOCs by USEPA Method 8260 and CP-51 SVOCs by USEPA Method 8270. Glassware will be supplied pre-cleaned and pre-preserved by the analytical laboratory. Sample preservation will consist of: storage in a cooler on ice to a temperature of 4ºC.

6.1.2 Vapor and Air Samples

Vapor samples will be collected from the SSDS monitoring points and ambient air samples will be collected as described in the SMP. Each sample will be analyzed for VOCs by USEPA Method TO-15. Samples will be collected in laboratory supplied batch-certified SUMMA canisters. The hold time for VOC analysis is 14 days.

6.1.3 PFAS Sampling Guidance

PFAS sampling, if performed, will be done so in accordance with NYSDEC guidance and procedures outlined in the Part 375 Sampling, Analysis, and Assessment of PFAS (April 2023) guidance document. The NYSDEC procedures and guidance for sampling for PFAS is included below:

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.

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  - 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.

The full Part 375 Sampling, Analysis, and Assessment of PFAS (April 2023) guidance document is included as Appendix Q-C.

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7.0 DECONTAMINATION PROCEDURES

In order to minimize the potential for cross-contamination, non-dedicated drilling and sampling equipment shall be properly decontaminated prior to and between sampling/possible drilling locations.

7.1.1 General Procedures

Sampling equipment and probes will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of in accordance with the procedures detailed in Section 5.9. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate protective equipment.

7.1.2 Sampling Equipment

Sampling equipment (i.e., trowels, knives, split-spoons, bowls, hand augers, submersible pumps, etc...) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled water rinse

7.1.3 Meters and Probes

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., PID meters) will be decontaminated between uses as follows:

- Laboratory-grade detergent and tap water solution wash
- Tap water rinse
- Distilled water rinse (triple rinse)

Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated disposable sampling equipment will be used. Decontamination fluids will be stored in US Department of Transportation (DOT)-approved 55-gallon drums or in an on-site storage tank (liquids only) until proper disposal. Personnel directly involved in equipment decontamination will wear protective clothing in accordance with the project Health and Safety Plan (HASP).

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8.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS

This section will discuss the type and quantities of QA/QC samples to be utilized during implementation of the field program.

8.1 Field Quality Control Samples

The subsections below present general information and guidance on field QC samples, including definition and frequency of QC blanks. Field QC samples will be labeled and shipped according to the procedures outlined in Section 5.0.

8.1.1 Equipment Blanks

An equipment blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Equipment blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment and collecting the rinsate. Equipment blanks will be collected at a frequency of one per decontamination event per type of sampling equipment, not to exceed one per day per sample matrix. Preservation and analysis of equipment blanks will be identical to that of the associated environmental samples.

8.1.2 Trip Blanks

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage and shipment procedures. In the event that VOC analysis is necessary, trip blanks will accompany VOC glassware in transit through sample collection and shipment to the laboratory. In addition, trip blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis (if any), and will be preserved as per the groundwater samples and analyzed identically to the associated environmental samples. VOC samples will be consolidated in one cooler for daily shipment, if possible, to minimize the number of trip blanks required in the field program. Due to the lack of VOC impact identified at the site, it is not anticipated that trip blanks will be necessary during remedial action.

8.1.3 Temperature Blanks

A temperature blank will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4ºC. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "USEPA cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

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8.1.4 Field Environmental Duplicate Samples

Duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated (i.e., "blind" duplicates). For example, the duplicate sample of location EP001 may be "coded" as location EP051, as long as there are not more than fifty endpoint samples being collected (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Precision of field data will be evaluated based on the calculation of Relative Percent Difference (RPD), with acceptance criteria of 25 percent for the off-site laboratory samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

8.2 Laboratory Quality Control Samples

General information and guidance on laboratory QC samples are presented in the subsections below. A summary of QC procedures, frequencies, criteria, and corrective actions for the samples, as determined by the applicable method guidelines.

8.2.1 Method Blanks/Preparation Blanks

A method blank (for organics) or a preparation blank (for inorganics) will be analyzed with every batch of samples to ensure that contamination has not occurred during the analytical process. Method blanks consist of a portion of analyte-free water or solid that is processed through the entire sample procedure the same as an environmental sample.

8.2.2 Matrix Spikes/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate samples (also known as spike/duplicate samples) will be used to assess precision and accuracy of the analytical methods. In this procedure, three aliquots of an actual field sample are collected at a specific location, and two aliquots are “spiked” by the addition of known amounts of an analyte or analytes and these samples are then analyzed identically to the field samples. A comparison of the resulting concentration to the original sample concentration and among the two “spiked” sample concentrations provides information on the ability of the analytical procedure to generate a correct result from the sample. Matrix spike/matrix spike duplicate samples will be collected in the field at a rate of five percent, and will be analyzed on

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a per batch basis, with up to 20 samples per week constituting a batch. The validity of matrix spike/matrix spike duplicate recovery and relative percent difference values will be determined using the acceptance criteria

8.2.3 Laboratory Control Samples

A laboratory control sample (LCS) consists of an analyte-free water or solid phase sample that is spiked with target analytes at a known concentration. The LCS shall be analyzed for every batch of samples (i.e., 1 per 20) to assess the ability of the analytical procedure to generate a correct result without matrix effects/interferences affecting the analysis. The percent recoveries for the LCS compounds will be compared to QC limits stated in the appropriate methods.

8.2.4 Surrogate Compounds

Surrogates (also known as System Monitoring Compounds) are compounds of known concentrations added to every organic analysis sample for analytical chromatography methods at the beginning of the sample preparation to monitor their recovery. Surrogate recoveries will be used to assess potential matrix interferences and to monitor any potential effects of sample preparation and analysis on final analyte concentrations. The recovery values will be compared to values established in the applicable methodologies to determine the validity of the data.

8.2.5 Internal Standards

Internal standards are used to provide instrument correction for variation in instrument performance and injection volumes. Internal standards also establish relative response factors for the analytes.

8.2.6 Interference Check Samples

An interference check sample (ICS), which contains target analytes at known concentrations, verifies the laboratory's interelement and background correction factors. Analysis of ICS samples is unique to metals analysis using the inductively coupled plasma (ICP) method.

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9.0 INSTRUMENT CALIBRATION AND PREVENTIVE MAINTENANCE

9.1 Calibration

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will be calibrated to factory specifications, if required. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary (i.e. PID calibrations) following manufacturers standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

The Field Team Leader or his designee will be responsible for ensuring that instrumentation are of the proper range, type and accuracy for the measurement/test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement shall be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information shall be documented on in a designated field logbook. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). All project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use.

In addition, all field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken.

Any equipment found to be out of calibration shall be recalibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment. Any instrument consistently found to be out of calibration shall be repaired or replaced.

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9.2 Preventive Maintenance

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented in the designated field logbook and shall be undertaken by personnel who have the appropriate skills and/or training in the type of maintenance required.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

10.1 Data Reduction

10.1.1 Field Data Reduction

Field instrumentation data will be reported by site personnel in field logbooks associated with the monitoring event. At the end of each monitoring event, the field screening data results shall be summarized in tabulated form, as warranted.

10.1.2 Laboratory Data Reduction

All data generated by the off-site laboratory will be reported in a specified format containing all required elements to perform data validation. Analytical results shall be presented on standard NYSDEC ASP-B forms (when necessary) or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data.

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10.1.3 Project Data Reduction

Following receipt of the laboratory analytical results by PWGC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

10.1.4 Non-Direct Measurements

If information necessary for the project has not been measured directly in the field, non-direct measurement data may be obtained from literature files, texts, computer databases, etc. References utilized will be acknowledged sources within the specific discipline. An explanation of the rationale behind using the reference and a description of any concern regarding the use of the referenced data (e.g., uncertainty, conflicting literature, etc.) shall be made within the report. Non-direct measurement data, after usage, will be filed within the project files for the length of the project.

10.2 Data Usability and Validation

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial action decisions. Based upon this, data use usability and validation will be performed as described below. Complete data packages will be archived in the project files, and if deemed necessary additional validation can be performed using procedures in the following sections. It is anticipated that data validation will be performed on data collected during the final round of sampling, only.

10.2.1 Data Usability and Validation Requirements

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance to NYSDEC ASP, Category B data deliverable requirements as applicable to the method utilized.

10.2.2 Data Usability and Validation Methods

If deemed necessary by NYSDEC, a data usability evaluation for the data collected and a data usability summary report (DUSR) will be prepared each sampling event performed under the requirements of the SMP. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

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Independent third party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by a qualified subcontractor independent of the project.

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11.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the PWGC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the project, all changes to the SMP will be documented in field logs/sheets and the PWGC PM will be advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PWGC PM shall be responsible for controlling, tracking, implementing, and distributing identified changes.

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APPENDIX Q-A

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Andrew Lockwood, PG, LEP

SR. VICE PRESIDENT

PROFESSIONAL EXPERIENCE
PWGC: 18 years
PRIOR: 17 years

AREAS OF EXPERTISE
Phase I and Phase II Environmental Site Assessments
PFAS and other emerging contaminants
Petroleum spill site investigation/remediation
CERCLA sites
NYSDEC Brownfield Cleanup Program/Environmental Restoration Program
Environmental/Regulatory Compliance (Investigation/Remediation Mgmt.)
Radiological Characterization & Remediation
Chemical, Radiological/Mixed Waste Management & Disposal
Groundwater Treatment System (Planning, Design, O&M)
Client Representation & Regulatory Liaison
Environmental Program Mgmt. (Planning, Monitoring, Safety)

EDUCATION & TRAINING/CERTIFICATION
BA Geology, SUNY Potsdam, NY
Licensed Professional Geologist - NYS
Licensed Environmental Professional (LEP), State of Connecticut
"D&D of Research Reactors & Other Small Nuclear Facilities" Certificate (Argonne National Laboratory, 11/2001)
OSHA Health & Safety 40-hr, Supervision 8-hr
30-hr OSHA Construction Safety Training,2009

PROFILE

Mr. Lockwood specializes in planning and managing U.S. Environmental Protection Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and New York State Department of Environmental Conservation (NYSDEC) remedial investigations/Feasibility Studies, Phase I and Phase II ESAs, Brownfields Cleanup Program (BCP) projects, and nuclear facility decontamination & decommissioning (D&D). He has worked at numerous DOE and DOD facilities in more than a dozen states across the country managing remedial investigation/feasibility study projects involving the generation of radiological, hazardous, and mixed waste. They include multi-year projects that involved complex investigations, remediation, and waste management issues. Mr. Lockwood manages PWGCs environmental group, overseeing a staff of more than 20 professionals.

Mr. Lockwood has over 35 years of experience managing environmental investigation and remediation projects including CERCLA RI/FS sites, NYSDEC BCP sites, NYCDEP "E" sites, Municipal Landfill permitting and closure, and environmental investigations for real estate transactions. Mr. Lockwood's clients range from large governmental agencies to small real estate developers. He has performed work across the eastern United States under numerous federal, state, and local regulatory agencies.

NOTABLE PROJECTS

Suffolk County Fire Training Facility - Yaphank, NY—RI/FS (Ongoing)

Mr. Lockwood manages the ongoing RI/FS for the Suffolk County fire training facility in Yaphank, NY. The 28-acre site is in the NYSDEC's inactive hazardous waste site program. The site was listed as a NYS Class 2 Inactive Hazardous Waste Disposal Site in August 2017. The primary contaminants of concern are per and poly fluoroalkyl substances (PFAS). The presence of these compounds is the result of the use of the Aqueous Film Forming Foam (AFFF) at the site. Mr. Lockwood was responsible for the preparation of the Citizens Participation Plan, Records Search Report, RI Work Plan, Quality Assurance Project Plan and Health and Safety Plan. The RI field work included delineation of PFAS in soil on-site and in groundwater both on and off site. PWGC is currently preparing a feasibility study with alternatives to address both soil and groundwater contamination at the site.

Wertheim National Wildlife Refuge - Shirley, NY—POET System Design and O&M (Ongoing)

Three Point of Entry Treatment (POET) Systems were designed and installed at the refuge, one in a maintenance garage and two in residential buildings located within the refuge. The POET Systems were designed to remove per and poly fluoroalkyl substances (PFAS) that were detected in the groundwater supply wells servicing the three structures. Mr. Lockwood was responsible for the preparation of an Engineering Report and Operations and Maintenance Manuals for the systems. PWGC oversaw the installation

and start up testing of the systems and is performing the scheduled system sampling to ensure that the systems are functioning as designed.

Carmans River - Shirley, NY—Surface Water and Biota Monitoring (Completed)
Mr. Lockwood managed the investigation of per and poly fluoroalkyl substances (PFAS) in surface water and biota within the Carmans River and other water bodies within Suffolk County. Mr. Lockwood prepared a Biota Monitoring Work Plan/QAPP that included the collection of surface water and biota samples (eels, blue crabs, white perch, and clams) for PFAS analysis. He prepared a Biota Monitoring Report detailing the results of the investigation.

Project Manager- Building 650 Demolition (Completed)
Mr. Lockwood managed the D&D of the former hot laundry and equipment decontamination facility (Bldg. 650) at BNL between 2020 and 2021. The project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including a Remedial Action Work Plan, Sampling and Analysis Plan, and Completion Report. The project involved the disposition of complex waste streams and the completion of a as left radiological survey. Mr. Lockwood was responsible for completing the project on schedule and within the allocated budget.

Brookhaven National Laboratory - Upton, NY (Completed)
Mr. Lockwood served more than 10 years as Project Manager on various CERCLA projects for BNL Environmental Restoration Division (ERD). He has managed diverse projects for BNL's Groundwater, Surface, and Reactor Groups. On his most recent projects for the Reactor Group, Mr. Lockwood provided project management services on four remediation projects over a 3-year period with budgets totaling more than 15 million dollars. In addition, he has prepared or assisted in the preparation of site-specific project documents such as work plans, sampling and analysis plans, quality assurance project plans, health and safety plans, records of decision (ROD), completion reports, final status surveys, remedial investigations (RI) and feasibility studies (FS). He has prepared contract documents, including request for proposals (RFP's), scopes of work (SOWs), and contract specifications for both large- and small-scale procurements and has acted as the technical representative on multiple contracts, ensuring the contract scope is being completed.

Mr. Lockwood combines his technical background with his in-depth knowledge of BNL's protocols and procedures to prepare schedules and cost estimates for baseline and fiscal year budgeting and tracking, provide short-term assistance to help BNL complete Baseline Change Proposals, and long-term assistance to manage remedial projects.

Project Manager- Fan Houses and Stack Silencer D&D, Underground Utilities Removal, Perimeter Area Soil Remediation Projects
Mr. Lockwood managed multiple remediation projects at BNL between 2008 and 2011. Project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including Remedial Action Work Plans, Sampling and Analysis Plans, and Completion Reports. The projects involved the disposition of complex waste streams. He was the primary interface with regulatory agencies and DOE. Mr. Lockwood was responsible for completing the projects on schedule and within the allocated budget. All projects were successfully completed.

Brownfield Cleanup (BCP) and Environmental Restoration Program Projects (Ongoing)
Mr. Lockwood manages BCP and ERP projects for both private and municipal clients. He prepares applications, technical documents, and interfaces with NYSDEC project managers to ensure project schedule and scope meet NYSDEC's requirements for approval of incentives/reimbursements. These sites require preparation of BCP and ERP applications, technical work plans, RI reports, human health and ecological assessments, remedial alternatives reports (FS), citizens participation plans, public meetings, and completion reports. Under contract with the Suffolk County department of Health Services (SCDHS) and the Department of Public Works (DPW), Mr. Lockwood assists the County in managing the technical aspects of County owned sites in the NYSDEC Brownfields Cleanup and Environmental Restoration Programs. These sites include former United State Air Force Disposal Sites and former industrial and gasoline service station sites, which are currently vacant or unused because the redevelopment of the sites is hampered by historical site uses that contaminated soil and groundwater.

Dwight Chase .

PROJECT HYDROGEOLOGIST

PROFESSIONAL EXPERIENCE
PWGC: 1 year

AREAS OF EXPERTISE
Water, Soil, Air Sampling
Field Work (Protocol, Oversight, Documentation)
Site Investigation/Analysis
Health & Safety Monitoring
Sampling

EDUCATION & TRAINING/CERTIFICATION
BS, Earth Environmental System Science, The City University of New York
BS, Mechanical Engineering, Penn State University
10-Hour OSHA Hazard Recognition Training for the Construction Industry.
HAZWOPER 40-Hour
Autodesk Inventor Certified User

PROFILE

Mr. Chase, a graduate from CUNY in Earth Environmental System Science, will work with the Environmental Unit focusing on remediation and due diligence projects throughout New York. He will provide management, oversight, and documentation on projects, technical field services for environmental investigations, and due diligence inspection services. He will continuously improve his skills in the areas of soil sampling, groundwater monitoring, air quality sampling and Phase I & II site assessments. He has an excellent track record of timely completion of deliverables, monitoring, and document preparation, while successfully maintaining communication between multiple stakeholders.

NOTABLE PROJECTS

Jennifer Lewis, PG .

VICE PRESIDENT

PROFESSIONAL EXPERIENCE
PWGC: 17 years

AREAS OF EXPERTISE
NYSDEC Brownfield Cleanup Program Management
NYCOER Brownfield and "E" Designation Management
Work Plan/Report Preparation
Phase I & II Environmental Site Assessments
Underground Injection Structure Remediation
Underground Storage Tank Remediation
Water, Soil, Air Sampling
Data Management & Interpretation
Groundwater Remediation via Chemical Injection

EDUCATION & TRAINING/CERTIFICATION
MBA, CUNY Baruch, New York, NY
BS, Geology, SUNY Stony Brook, NY
AA, Liberal Arts, Suffolk County Community College, Selden, NY
Licensed Professional Geologist - NYS
OSHA Health & Safety 8-hr Supervisor, 40-hr HazWoper
Construction Management Certification
ASTM Training on Phase I and Phase II Environmental Site Assessments for Commercial Real Estate

PROFILE

As a Vice President, Ms. Lewis has assisted property buyers, sellers, and developers navigate potential environmental concerns, petroleum spills, the New York State (NYS) Brownfield Cleanup Program, the New York City (NYC) E-Designation Program/Voluntary Cleanup Program requirements during property transactions and site development. Ms. Lewis's roles on these projects has included planning, conducting, and reporting soil/groundwater investigations, air quality studies, and instituting remedial measures. Her clients, ranging from developers to attorneys to municipal agencies, benefit from her expertise in overseeing Phase I and II Environmental Site Assessments (ESAs), Remedial Investigations, cost to cure estimates for financial institutions, and Brownfields projects. Ms. Lewis coordinates with clients and attorneys to prepare plans for approval by federal, state, and local agencies (e.g., Remedial Action Plans, Health and Safety Plans, Investigation Work Plans, Interim Remedial Measures) and monitors each project's day-to-day progress to meet the client's objectives and regulatory requirements.

NOTABLE PROJECTS

Phase I & II Environmental Site Assessment

Ms. Lewis manages Phase I & II ESA preparation, implementation, and completion. For each project, she provides a customized scope of work and relevant documentation to provide clients with pertinent information. She performs Phase I & Phase II ESAs for private clients, environmental attorneys, municipalities, and lending institutions for use in property transactions according to ASTM Standards.

Brownfield Redevelopment

AvalonBay Communities, Inc. – Former Darby Drug Facility, Rockville Centre, NY – NYSDEC Brownfield Cleanup Program Implementation During Development

The Former Darby Drugs Distribution Center was a commercial warehouse formerly occupied by a textile company which was a source of PCE contamination to soil and groundwater beneath the site. The site was enrolled in the NYSDEC Brownfield Cleanup Program (BCP). Ms. Lewis implemented an Interim Remedial Measure which included a sophisticated soil excavation and dewatering program within a warehouse, chemical injections into the groundwater, and UIC remediation. Ms. Lewis then documented the Interim Remedial Measure effort and prepared an Alternatives Analysis and a Remedial Action Work Plan to provide a scope for additional remediation and a Final Engineering Report and a Site Management Plan to document the results of the remedial action and protective steps to follow for the future use of the site.

Brownfield Redevelopment

Coney Island Realty - NYSDEC BCP Site

During the Interim Remedial Measure Phase, Ms. Lewis coordinated the soil excavation, community air monitoring, and sampling activities. Ms. Lewis also prepared reports detailing the Supplemental Remedial Investigation and Interim Remedial Measure, as

well as the Remedial Action Work Plan to provide a scope for additional remediation and a Final Engineering Report and a Site Management Plan to document the results of the remedial action and protective steps to follow for the future use of the site. Ms. Lewis has continued overseeing the routine operation and maintenance of a soil vapor extraction system operating at the site.

Suffolk County Department of Public Works (SCDPW) - Suffolk County, NY
UIC Remediation
Ms. Lewis was responsible for maintaining a UIC structure database for SCDPW and conducting UIC investigations and remediations as part of the planned upgrade of SCDPW site sanitary upgrades. Ms. Lewis coordinated closely with SCPWS, SCDHS, and contractors to conduct this work efficiently and within budget.

Brookhaven National Laboratory - Upton, NY
OUIII Western South Boundary/OUI South Boundary Vertical Profiles and Monitoring Well Installation
Ms. Lewis provided sampling services and hydrogeologic oversight for multiple vertical profiles, as part of the on-site OUIII plume evaluation. Her responsibilities included the collection of groundwater samples during sampling. She was responsible for construction observation and documentation for 3 monitoring well installations. After installation, wells were developed by pumping and surging. Ms. Lewis documented field activities and verified the work that was performed in accordance with BNL's Standard Operating Procedures and Project Work Plans. She conducted daily tailgate safety meetings, completed BNL's daily field reports and reported to BNL's Project Manager at the completion of each day.

Pratt Institute – Brooklyn, NY
Well Installation
Ms. Lewis provided over-site for the installation of a geothermal test well. She generated boring logs, documented soil characteristics, and classified in accordance with USGS' Monthly/Quarterly Groundwater/Air Sampling.
Well Monitoring
Ms. Lewis performs routine monitoring and sampling of air and groundwater, and product removal if necessary, at various sites. In addition to the fieldwork at these sites, Ms. Lewis analyzes the data and prepares a site plan and a quarterly report detailing the results and future recommendations.

Brookhaven National Laboratory - Upton, NY
Environmental Protection Division: Groundwater Protection and Remediation
Ms. Lewis supervised the installation of multiple vertical profiles via geoprobe to monitor strontium-90, tritium, and volatile organic compound (VOC) plumes on site. Her responsibilities included the collection of groundwater samples during sampling. Ms. Lewis documented field activities and verified the work that was performed in accordance with BNL's Standard Operating Procedures and Project Work Plans. She conducted daily tailgate safety meetings, completed BNL's daily field reports and reported to BNL's Project Manager at the completion of each day.

Newark-Liberty International Airport
The Automotive Fueling Station at Newark-Liberty Airport is the site of a UST failure regulated by the NJDEP Site Remediation Program. Ms. Lewis performs routine groundwater monitoring and sampling as well as supplemental remedial activities at the site. Ms. Lewis is also responsible for coordinating field activities with regulators and assisting with preparation of periodic Status Reports. Field work and reporting is completed in accordance with NJDEP Technical Requirements for Site Investigation 7.26E.

New York City Housing Authority - New York City, NY
Sub-Surface Investigations
Ms. Lewis performs environmental assessments associated with site specific NYSDEC spill files in order to delineate petroleum and tetrachloroethene impacts. Specifically, collection of soil, groundwater, and sub-surface air samples, oversight of monitoring well installations, preparation and submittal of site assessment reports, and coordination with NYCHA staff and regulatory agencies.

NYCDEP/NYCOER "E" Designation Sites - New York City, NY
RAP & HASP enforcement, air monitoring for particulates and VOCs
Ms. Lewis's services focus on coordinating remedial investigations, preparation of Remedial Investigation Reports, preparing a Remedial Action Scope of Work that considers the contaminants identified at the site as well as the intended use and building design, coordinating the remediation, and documenting the results of the remediation. Ms. Lewis, with the assistance of the architect and mechanical engineer of record, has also prepared Remedial Action Work Plans and Installation Reports for Air and Noise "E"s.

Former Penetrex Remedial Investigation
Ms. Lewis oversaw a chemical injection at a former dry cleaning facility utilizing a Geoprobe® that drilled down to 50 feet below grade and pulled the rods up during the injection.

USEPA Superfund Site
Treatment System O&M
Ms. Lewis provided assistance with the remediation efforts of the down-gradient pond system and oversight of the down-gradient recovery well installation for the USEPA Superfund remediation project. Additional duties included sampling backfill material brought on-site and overseeing the backfilling and compaction of excavations. Allstate Insurance Company – NY Wide
Residential/Commercial Fuel Oil Spills Oversight & Reporting - Ms. Lewis oversees fieldwork for projects such as petroleum spill remediation. She completes spill reports, and coordinates with contractors and the NYSDEC to ensure that the project stays on schedule, is compliant with regulatory guidelines, and meets the client's goals.

UIC Control Programs - Suffolk and Nassau Counties, NY
Remediation Oversight
Ms. Lewis has been overseeing the remediation activities of dry wells (Class V wells) at multiple sites for various clients throughout Suffolk and Nassau Counties. She performs endpoint sampling of storm drains and sanitary systems, coordinates and performs sampling in conjunction with the SCDHS and NCDH, and ensures proper soil and sediment removal during VacTruck operations.

Rechler Equity Partners - Melville, NY
250 Miller Place, Hicksville, NY
The subject site, a large commercial property and formerly used by a circuit board manufacturer and trucking company, had a history of chemical uses (i.e. chlorinated solvents, diesel fuel, and gasoline). To determine if subsurface soils had been impacted, PWGC conducted a Phase II investigation for a potential buyer. Ms. Lewis was present during the Phase II and oversaw the project's subsurface investigation-phase. She directed the Geoprobe® operator, and participated in the preparation of the Phase II investigation report. In addition, Ms. Lewis observed the follow-up investigation and remediation performed by the current property owner's consultant.

Franklin Hospital - Valley Stream, NY
Water Sampling
Ms. Lewis collected water samples from the dialysis treatment suite and from a sink in order to determine the source of a bacterial contamination.

Ryan Morley, PG.

SENIOR PROJECT MANAGER

PROFESSIONAL EXPERIENCE
PWGC: 14 years

AREAS OF EXPERTISE
Water, Soil, Air Sampling
Phase I/II ESA
Field Work (Protocol, Oversight, Documentation)
Site Investigation/Analysis
Health & Safety Monitoring
Soil/Groundwater Investigations, Analysis, Sampling
(Manual; Direct Push Technology Techniques)
UST Remediation Hazardous Waste Site Investigation/Cleanup
Underground Injection Well Monitoring

EDUCATION & TRAINING/CERTIFICATION
BS, Geology, University at Buffalo, NY
Licensed Professional Geologist - NY
40-hr OSHA HAZWOPER, 8-hr Annual Refresher, 10-hr Construction Safety & Health
Confined Space Entry
MTA, LIRR & Staten Island Track Safety Training
CPR/Standard First Aid
OSHA 10-hr Construction Course
SWPPP – Stormwater Pollution Prevention Planning Course

PROFILE

Mr. Morley provides hands-on support to implement field activities according to work plans and project schedule. He works closely with clients, sub-contractors, and regulatory agencies to ensure prompt and accurate data collection/dissemination. Routinely, Mr. Morley monitors drilling operations and collection of groundwater elevation measurements, and performs several methods of groundwater sampling, utilizing numerous field-screening instruments, and sampling tools.

NOTABLE PROJECTS

PHASE I/PHASE II ESA

Phase I & Phase II Environmental Site Assessment (ESA)

Mr. Morley manages Phase I & II ESA preparation, implementation, and completion. For each project, he provides a customized scope of work and relevant documentation to provide clients with pertinent information. He performs Phase I & Phase II ESAs for private clients, environmental attorneys, municipalities, and lending institutions for use in property transactions according to ASTM Standards.

Avalon Bay Communities, Inc. (Former Darby Drug Facility) Rockville Centre, NY

New York State Department of Environmental Conservation (NYSDEC) Brownfield's Clean-up Program (BCP) Implementation at 80-100 Banks Avenue

Mr. Morley performed soil, water, and concrete sampling on site after demolition activities. He was also responsible for the oversight of the strict Community Air Monitoring Program during the soil excavation of the chlorinated solvent impacted soils in the middle of a residential neighborhood. Mr. Morley also provided oversight and sampling of the dewatering and treatment system to ensure compliance with NYSDEC SPDES requirements. Following completion of the groundwater treatment system, he conducted routine operation, maintence and sampling services for the client to ensure that the plume was stabilized as required by the State approved Remedial Action Work Plan.

GTJ-GROUP/GREEN BUS LINES, INC. - QUEENS/BROOKLYN, NY

Hydrogeology/Environmental Services

Services range from Site Investigation (Oversight, and Sample Collection) at six large bus facilities. Mr. Morley conducted site/facility investigations and provided system operation of a free phase groundwater contamination treatment system.

Residential/Commercial Fuel Oil Spills Oversight & Reporting

Mr. Morley oversees planning, contractor solicitation and implementation, fieldwork and project reporting for projects such as petroleum spill investigations and remediation. He prepares spill investigation reports and closure reports, and coordinates with

contractors and the NYSDEC to ensure that the project stays on schedule, is compliant with regulatory guidelines, and meets the client's goals.

The Hudson Companies, Brooklyn, NY
NYCDEP Restrictive Declaration Services at 1490 Dumont Avenue in Brooklyn
Mr. Morley was responsible for making sure job proceedings were within NYCDEP regulations. He prepares and implements community air monitoring during remedial activities, inspects vapor barrier installations, and provides oversight during the impacted soil excavation and site remediation activities.

The Witkoff Group, New York, New York
NYCDEP Restrictive Declaration Services at 303 West 10th Street
Mr. Morley provided oversight of contaminated soil cleanup and enforced the correct disposal of soils being exported from the site. In addition, he was responsible for air monitoring and daily reporting to the New York City Office of Environmental Restoration (NYCOER).

Innovant Group - Islandia, NY
Underground Injection Control (UIC) Remediation
Mr. Morley performs endpoint sampling of storm drains and sanitary systems, coordinates and performs sampling in conjunction with the Suffolk County Department of Health Services (SCDHS) and Nassau County Department of Health (NCDH), and ensures proper soil and sediment removal.

Lakehill Associates, Massapequa, NY
Tank Pull & Oxygen Release Compound (ORC) Injection Reporting at 672 Broadway Avenue in Massapequa, NY
Mr. Morley provided field oversight during the removal of Underground Storage Tanks (UST) that included inspecting the tanks for damage and collection of end-point samples. Following the removal of the tanks, he provided oversight of the backfilling as well as Regenox injections and monitoring of the well installation.

Computer Circuits – Hauppauge, NY
US Environmental Protection Agency (USEPA) Regulated Groundwater Sampling
Mr. Morley conducted quarterly sampling at this Federal Superfund site that has a very strict sampling process.

CDM Federal Programs, Matteo & Sons Site -Thorofare, New Jersey
Remedial Investigation/Feasibility Study
The former Computer Circuits industrial site is a US Environmental Protection Agency Superfund Site. Mr. Morley collected groundwater and soil samples in accordance with USEPA guidelines at this National Priorities List site.

Allied Aviation Services of New York, Queens, NY
Sampling
Mr. Morley performs groundwater sampling as well as bimonthly well gauging and product removal at LaGuardia Airport. In addition, he assists in the preparation of the status reports quarterly for the submission to the New York State Department of Environmental Conservation (NYSDEC).

105 Metropolitan Ave, LLC, New York, NY
E-Designation Remedial Action Work Plan (RAWP) Implementation
Mr. Morley provided field oversight services at the site which was entered into the NYCOER Voluntary Cleanup Program. Services included reporting to the NYCOER, onsite soil inspection, community air monitoring and coordinating with contractors for the removal of impacted soils to Track 1 standards.

Stiner Studios - Brooklyn, New York, NY
Site Management Plan and Remediation Management
Mr. Morley provided project management for redevelopment projects within the Brooklyn Navy Yard for properties owned by Stiner Studios. These projects were overseen by the NYSDEC and NYCOER and Mr. Morley was the primary environmental manager for these sites. These projects were completed to the satisfaction of NYSDEC and NYCOER with the assistance of Mr. Morley's oversight.

2840 Atlantic Avenue - Brooklyn, New York, NY
Site Management Plan and Remediation Management
Mr. Morley was the primary environmental project manager for the remediation of a 1-acre property in Brooklyn, New York under the NYSDEC BCP program. Mr. Morley was responsible for the proper enactment of a detailed remediation plan that included the removal of contaminated soil, the treatment of impacted groundwater, and the installation of a soil vapor mitigation system. Mr. Morley prepared a final engineering report and site management plan following remediation activities and was responsible for obtaining a NYSDEC COC for the client on time.

APPENDIX Q-B

P.W. GROSSER CONSULTING, INC.
P.W. GROSSER CONSULTING ENGINEER & HYDROGEOLOGIST, P.C.
PHONE: 631.589.6353 PWGROSSER.COM 630 JOHNSON AVENUE, STE 7 BOHEMIA, NY 11716
LONG ISLAND • MANHATTAN • SARATOGA SPRINGS • SYRACUSE • SHELTON

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760/827-1100 Fax: 760/827-1099

RESUME
PEI GENG

EDUCATION

M.S. Organic Chemistry, 1989
Sam Houston State University

B.S. Environmental Chemistry, 1983
Nankai University

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
1997 to present

Ceimic Corporation
GC/MS and GC Chemist
1996 to 1997

PACE Analytical Service Inc.
GC/MS and GC Chemist
1990 to 1996

REPRESENTATIVE EXPERIENCE

Ms. Geng has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

Specifically, Ms. Geng has over 25 years organic data validation experience using USEPA CLP (including Region III) functional guidelines and other applicable documents.

- As chemist with LDC, Ms. Geng specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.

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Ms. Geng has over 7 years of experience in an environmental laboratory performing the analysis of organic parameters.

- As both a GC and GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses.

- As both a GC and GC/MS chemist at PACE Analytical Service Inc., a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses as well as overseeing the final reporting of analytical data, and compliance with method requirements.

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P.W. Grosser
630 Johnson Avenue
Bohemia, NY 11716
Attn: Mr. Derek Ersbak, PG | Vice President

February 9, 2023

Subject: Data Validation Services for NYSDEC Brookhaven Calabro Airport Site Remediation Sampling

Dear Ms. Ersbak:

Thank you for inviting Laboratory Data Consultants, Inc. (LDC) to bid on the above noted project. We look forward to supporting your data validation needs and are pleased to submit our response.

We would like to highlight the following points regarding our submittal:

- LDC has an extensive history of providing data validation and data management services for numerous DoD, USACE, Navy, USEPA (all regions), state & local agency programs for over 30 years.
- LDC is a small business entity under NAICS code 541380, meeting the size standard of less than 15Million USD, and is self-certified with the SBA.
- LDC is a data validation, quality assurance, and data management subcontractor with an impeccable track record for timeliness, quality, technical expertise, and the ability to mitigate complex data quality issues. Our clients will confirm our current and past performance under DoD (including USACE), DoE, and commercial programs. We have experience and a proven track record commensurate with the requirements of this RFP.

Our technical proposal will demonstrate how LDC's qualifications meet and exceed the critical technical and capacity requirements for this data validation subcontract.

Capacity

- LDC has the ability to support a project of this size with a staff of over thirty (30) chemistry professionals. This level of support will allow for appropriate primary and secondary QA/QC review within the critical schedule. Additionally, LDC's capacity allows for flexibility if expedited review is required.

Past Performance

- LDC has performed data validation on a wide variety of projects in our 30+ years in business including Various Passaic NJ sites, NYSDEC programs, more than 200 Army Corps sites, over 180 AFCEE/AFCEC sites, more than 50 EPA and Superfund sites, in support of multiple Navy CLEAN and RAC contracts and commercial client programs. This experience reflects a thorough understanding of multiple validation guidelines including NYSDEC ASP, EPA NFG, DoD QSM and EPA Region-specific and state-specific protocols.

PFAS Experience

- LDC's largest PFAS project to date for data validation is for a Confidential Project Location. The data validation is performed per Level 3 and Level 4 equivalent PFAS in water samples for EPA Method 537 and Laboratory Method. Total billing to date for this project is over $32,000.00.

- LDC's SOP for Table B15 Validation of PFAS is AFCEC and USACE approved.

- LDC has also performed PFAS data validation for other projects including but not limited to Anchor project City of Everett, Arcadis project Joint Base McGuire-Dixon-Lakehurst, Anchor project Duwamish-King County, CAPE project Mather AFB, USACE Seattle project Moses Lake, EA Engineering project Fairchild AFB, and MWH project City of San Diego project. Since March 1, 2018, LDC has validated over 1800 SDGs for PFAS.

ADR Deliverables

- LDC is the software developer and expert in the use of the Automated Data Review (ADR) software. LDC uses the most current version of ADR meeting USACE and current DoD QSM requirements and has performed over 1000 ADR projects in the past 10 years, worth over $2,000,000 in revenue. LDC will provide technical support to the Client as needed for e-QAPP generation or EDD troubleshooting.

EDD Formats

- LDC is able to work with a variety of EDD formats including but not limited to Navy NEDD, USACE SEDD, EQuIS, FUDSChem, and ERPIMS. Any EDD format can be populated with data qualifiers.

LDC Advantage

- LDC Advantage is a 24/7 secure cloud-based portal designed for upload, notification, retrieval, and long term storage of project documents, including lab data packages, emails, validation reports, validated EDD, QCSR/DVSRs, project planning documents (QAPP, FSP, SOPs, etc.), and many others. LDC Advantage is compatible with both desktop and mobile devices. LDC Advantage provides quick and easy access to project status and a convenient way to upload and download project files.

EDMSi Database Hosting (Documents and Data)

- LDC can provide hosting of its EDMSi database for posting, retrieval, reporting and download of both data and documents. The monthly fee includes 99.99% uptime, 24/7 along with distributed site availability and daily backups. Multiple users can all access the EDMSi database without conflict from anywhere in the world via the internet. The monthly hosting fee also includes general maintenance and phone, email or web-conference support via LDC's Technical Support Group.

Subcontractors

- No subcontractors will be used for this project. This will allow for better quality control of the work product. LDC has sufficient staff and resources to handle this project without using subcontractors.

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LDC Company Information

- Primary NAICS Code 541380 (also 541690 and 541620)
- TIN# 33-0492643
- DUNS# 789643863
- Cage Code 04XK8, UEI# PEK5K6KMDYV1
- MBE (CPUC Certified)
- SBE (Port of Long Beach, California eProcure, and LAUSD Certified) Less than 50 Employees
- Registered in ORCA and SAM
- CA PWCR Registration # 1000047894
- LAUSD Vendor ID# 1000018015
- South Florida Water Management District SBE Vendor 105004
- New York State Vendor ID number 1100182981
- New York City PIP Vendor number VS00046623
- New Jersey State Vendor ID number V00026481

Project Management

- LDC will dedicate Ms. Stella Cuenco, Principal Chemist, as the overall program manager and Ms. Pei Geng as the project manager.

We appreciate the opportunity to support your company on this project and we look forward to working together in the future. Please feel free to call me at (760) 827-1100 if you have any questions after your review.

Sincerely,

Laura Soeten
Executive Administrator
Lsoeten@lab-data.com

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.

Submittal for:

Data Validation Services for NYSDEC Brookhaven Calabro Airport Site Remediation Sampling

SUBMITTED TO:

P.W. Grosser
630 Johnson Avenue
Bohemia, NY 11716
Attn: Mr. Derek Ersbak, PG | Vice President

PRESENTED BY:

Laboratory Data Consultants, Inc.
2701 Loker Ave. West, Suite 220
Carlsbad, CA 92010

February 9, 2023

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LDC Company Profile

LDC is a small, minority-owned (SBE/MBE) quality assurance and environmental chemistry company focused on data validation, data quality assessment, database implementation, and data usability. Our primary services include data validation, electronic transfer of data, oversight of quality assurance/quality control (QA/QC) programs, laboratory and field audits, technical support for litigation, and database management. Our corporate office located in Carlsbad, California is directed by Mr. Scott Denzer and Ms. Stella Cuenco, principal chemists with over 50 years of experience between them in the environmental laboratory and data validation industries

LDC is recognized as one of the leaders in the data validation industry through participation on major DoD and commercial projects such as:

- Army Corps of Engineers, DuPont Chambers (Baltimore District)
- Army Corps of Engineers, DuPont Chambers (Philadelphia District)
- Army Corps of Engineers, Various projects (New Mexico)
- Army Corps of Engineers, Camp Navajo (Tetra Tech)
- Army Corps of Engineers, Various projects, 8a Contract (Sacramento District)
- Army Corps of Engineers, Fort Ord (Shaw E&I)
- Las Vegas Wash Henderson Site (ERM)
- DOE NPR-1 Elk Hills (DOE direct and Ahtna)
- Nevada Environmental Response Trust (NERT) Henderson Site (Ramboll Environ)
- NOAA MDRA Mississippi Site (Entrix)
- Stringfellow Superfund Site (DTSC)
- BKK Landfill (Ramboll Environ)
- EPA Region IX ESAT QA Program (ICF)
- AFCEE/AFCEC, Andersen AFB (EA/Shaw)
- AFCEE/AFCEC, Loring/Pease AFB (Bechtel/MWH)
- AFCEE/AFCEC, Mather AFB (MWH)
- AFCEE/AFCEC, Army Corps of Engineers, Travis AFB (CH2M Hill)
- AFCEE/AFCEC, McClellan and Castle AFB (Jacobs Engineering Group)
- AFCEE/AFCEC, Beale AFB (Law/Crandall, Inc.)
- AFCEE/AFCEC, Andrews AFB (URS)
- Navy CLEAN Atlantic Division (EA Engineering)
- Navy CLEAN IV Southwest DIV (AECOM)
- Navy RAC Southwest Division (OHM Remediation/IT Group/Shaw)

LDC has successfully performed thousands of data validation projects worth over 20 million dollars for prime contractors servicing Air Force (AFCEE/AFCEC), Army Corps, Navy, and industrial activities.

LDC has developed well-documented procedures which support all facets of the data validation process. This includes critical steps such as:

- Project tracking
- Peer review for all data validation activities
- Internal training programs
- Internal and external audits
- Strict documentation
- Electronic deliverables

LDC as the "Best Value" Contractor

LDC is a data validation subcontractor with an impeccable track record for timeliness, quality, technical expertise, and the ability to mitigate complex data quality issues. Our clients will confirm our current and past performance under DoD (including USACE), DoE, and commercial programs. We have experience and a proven track record commensurate with the requirements of this RFP as demonstrated by the following:

- **LDC is the software developer and expert in the use of the Automated Data Review (ADR) software**. LDC has been using ADR.NET and has the current version in full implementation which meets USACE and current DoD QSM requirements. LDC has performed over 1000 ADR projects in the past 10 years, worth over $2,000,000 in revenue. LDC will provide technical support to the Client as needed for e-QAPP generation or EDD troubleshooting.

- Data validation experience as a subcontractor for more than 100 Army Corps sites, over 140 AFCEE/AFCEC sites, several EPA sites, and under 6 Navy CLEAN and RAC contracts and 150 Navy sites. This experience includes 15 years of data validation work under USACE direction and thorough understanding of the USACE Baltimore, EPA Region 2 and 3 validation guidelines, and the DoD QSM.

- Successful completion of USACE data validation activities since 1992 under subcontracts to various Districts including New England, Baltimore, Philadelphia, Omaha, Albuquerque, Seattle, Sacramento, and Jacksonville.

- Recent project experience in the Eastern region including support to four separate contractors on the Passaic River for varied projects and programs with revenues of 200K, and Gowanus Canal with GEI, revenues of 33K.

- **On-time delivery record of greater than 99%** with the ability to expedite turnaround as needed due to our large experienced staff as noted above.

- Successful completion of five DoD and two DoE audits to approve LDC's internal data validation procedures, QA program and documentation systems. (prior to 2000)

- Thorough secondary QA review program and **the capacity (30 full time chemistry staff) to handle a project of this magnitude and importance.** This significantly reduces additional work the consultant might otherwise need to do upon receipt of LDC reports.

Data Validation Capacity

LDC is continually evaluating and monitoring its capacity to meet client needs. It is company policy to not accept a project unless the service can be completed on-time with our expected quality of performance. This policy has proved very successful in meeting past project deadlines. Our client references will confirm our performance of on-time delivery.

Due to the versatile capabilities of our staff, personnel can also support multiple areas which are high in backlog. Our training program documents personnel approvals for all data review activities. All of our staff actively participate in the LDC training program.

LDC has met its contractual turnaround time requirement on over 99% of the projects completed. LDC has successfully completed projects which required data review capacity of as many as 2000 samples in one month.

Technical / Management Approach

LDC has established data validation and data management procedures which enable the thorough, consistent, timely, and efficient review of analytical data. Ms. Stella Cuenco, principal chemist, is responsible for all data validation related activities and has final authority for the company. The designated Project Manager will coordinate the day to day data validation activities and interface with the Client project chemist or PM as necessary. For day to day data review activities, data validators report directly to the senior chemist in the section of the review. Senior chemists report to the technical project manager. Data validation will be performed following the Client project specific requirements as stated in the Scope of Work (SOW).

As the Client alerts LDC of in-coming SDGs and associated ADR EDDs, the LDC project manager will log the order into the up-coming project list identified as the "LDC Project Backlog" form. This is now considered a booked order and is reserved a place in the schedule. The project manager will allocate and schedule staff resources for the project. He will generate a project specific summary which will detail the expected receipt date of the order, the due date, special method or QC requirements, and the data quality objectives (DQOs) of the project.

Once the data packages arrive, the packages are logged in according to LDC SOP 6.0.0 "Standard Operating Procedure for Sample Data Log-in". Computer generated worksheets for each SDG along with the "LDC SDG Table" and "LDC Sample Validation" spreadsheet are distributed to all project staff.

The "LDC SDG Table" spreadsheet is specific to each order and provides the project manager with an overview of individual SDGs and their associated analyses. Progress of projects is indicated daily on the spreadsheet. The "LDC Sample Validation" spreadsheet identifies individual analysis requested for all samples and supports the data reviewer in verifying that appropriate samples have been reviewed in each data package. The previously discussed tools and processes have been used to successfully meet deadlines and estimate project completion dates. Meetings are held routinely to assess the status of each project.

Throughout the data review process, the project manager monitors project status as stated above. If any scheduling or technical complications arise such that the quality of the review will be impacted, data review staff notify the project manager immediately for resolution. The project manager will keep the Client chemist current on the progress of all validation activities on a

routine basis via e-mail and telephone. Once the data review worksheets have been completed and approved by a secondary review, the final technical reports are written. All final technical reports are reviewed by at least two senior staff. This may include the Technical Project Manager, QA Director, or Lead Chemist. Upon shipping the final report, the Client project chemist will be contacted by phone.

Data Review/Validation Process

The data review and validation level of effort required for the Scope of Work outlined for this project will encompass several activities. The steps can be categorized in the following manner:

1) Sample Log-in

All samples submitted for data validation are entered into the LDC Log-in system. The system generates various spreadsheets for sample tracking, listings of laboratory and client identifications, sampling dates, analysis requested, matrix, and project due date. These tracking documents are distributed to all data validation, QA and project management staff.

2) Pre-screening of Data Packages

The pre-screening is performed concurrently with the sample log-in process. This task verifies sample chain-of-custody, data package completeness, and concurrence with the authorized delivery order.

3) Data Validation

The execution of the data review task requires the highest level of effort. The review process will be handled in a stepwise fashion including manual and automated data review. The validator will use manual review to document each finding on a Validation Findings form. Along with the finding, the reviewer will document the date of the occurrence, the lab reference identification, the validation criteria, the associated samples, and the qualification of the data. A Validation Checklist form is marked noting if validation criteria was met or exceeded. A Validation Checklist is enclosed for review (Exhibit A). These checklists are used as an inventory sheet to assure all samples were reviewed for each criteria. The findings documented on the Validation Findings form will be transcribed into the final summary report. Examples of recalculation and findings worksheets used for Level 4 validation are available for review upon request.

All initial validation performed by LDC has a secondary peer review. All final reports will be reviewed by a Senior Chemist or Principal Chemist.

4) First Report Review

The first review of the data validation report verifies that all findings and data qualification has been accurately transferred from the data validation worksheets. All sample identifications, methods, formatting, and general text are reviewed.

5) Senior Report Review

The senior review of the data validation report verifies that all findings, data qualification, and professional judgments previously integrated into the reports reflect the overall quality of the data. Any additional comments required to enhance the usability of the report will be inserted at this time.

6) QA Report Review

A QA check of selected data validation reports within an individual delivery order will be reviewed by the QA department. A formal nonconformance report will be generated for any identified deficiencies. The deficiency will be addressed with the appropriate staff and corrected prior to submittal to senior management for final review and signature.

7) Senior Management Review

The program/technical manager will perform an overall review of the final reports. He will sign the report cover letter and submit the report to the sample custodian for shipment to the client.

8) Electronic Data Deliverables (EDD)

This process will be initiated at step 1 with the receipt of files from the client or loading EDDs to LDC's secured Internet portal. After automated verification of the EDD format, content, and fields, the EDD will be populated with the manual review for importing of the final data qualifiers. The final approval of qualifiers will occur after step 5.

LDC will self-perform the above tasks to maintain quality and control of the work product.

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Exhibit A

LDC #:____
SDG #:____
Laboratory:___

VALIDATION COMPLETENESS WORKSHEET

EPA Level IV

Date:_____
Page:_of_____
Reviewer:
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 8260B)
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	/	
II.	GC/MS Instrument performance check		
III.	Initial calibration/ICV	/	
IV.	Continuing calibration		
V.	Laboratory Blanks		
VI.	Field blanks		
VII.	Surrogate spikes		
VIII.	Matrix spike/Matrix spike duplicates		
IX.	Laboratory control samples		
X.	Field duplicates		
XI.	Internal standards		
XII.	Compound quantitation RL/LOQ/LODs		
XIII.	Target compound identification		
XIV.	System performance		
XV.	Overall assessment of data		

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1				
2				
3				
4				
5				

Notes:

LDC Corporate Resources

LDC personnel have experience and formal training in the areas of data validation, electronic data deliverables and laboratory QA/QC. LDC personnel have performed data validation in all analytical disciplines. These include, but are not limited to, GC/MS volatiles, GC volatiles, GC/MS semivolatiles, GC pesticides, ICP metals, ICP/MS metals, GFAA metals, GC petroleum hydrocarbons, GC/MS dioxins, explosives, radiochemistry, and wet chemistry. This versatility allows our organization to adapt to workload changes and allows for an excellent secondary review system. Our organization is structured to allow direct communication between project managers, data validators, and clerical staff which occurs on a daily basis.

With LDC's 30+ years as a national leader in the data validation industry and extensive experience supporting projects with multiple EPA regions, DoD and DOE facilities, LDC is confident our data validation services will successfully meet all project requirements. The validation group is managed by Ms. Stella Cuenco, principal chemist, who has over 30 years of experience, the software products and services group is managed by Mr. Scott Denzer, who has over 40 years of experience, and the overall operations are directed by Mr. Michael Takaki, president.

The validation group is divided into chemists by discipline, organics (GC/MS, GC and HPLC) and inorganics (wet chemistry, IC, ICP, ICP/MS). All chemists report to senior group leads. A separate group performs data package log-in to the LDC tracking system. Another group performs the EDD population and verification. Judy Ecklund leads this group and has over 13 years of experience in EDD population, preparation, and uploading to various databases.

The majority of the data validation staff at LDC have been employed for over 10 years with some senior staff over 20 years as noted in the attached resumes. This level of stability and experience will ensure project stability and consistency.

In addressing LDC's financial status, LDC has an excellent Dun & Bradstreet report and has been profitable for the past 15 years. LDC has grown at approximately 10% in each of the past 5 years and continues to be a leader in our environmental sector of the data quality business. References are available from our vendors and clients to confirm our business success. Our annual revenue of approximately $4,000,000 per year in data validation work makes LDC one of the largest independent data validation firms in the nation.

LDC will commit the resources and materials to successfully complete this project with the required time period and with a high level of quality.

Project Team Summary

LDC personnel have hands-on experience in the areas of data validation, laboratory QA/QC, CLP SOWs, and environmental laboratory analyses. As documented in the resumes of our staff, the project team has significant experience with USACE and DoD protocols, current technology, SW-846, and all methods stated in the SOW.

LDC is presenting the following staff to perform key roles for this contract. The key staff of the project team and their experience are as follows:

- **Stella Cuenco, Principal Chemist/Operations Manager**
  Project Role: Principal Chemist/Program Manager
  Data Validation Experience: 26 years
  Overall Laboratory and Data Validation Experience: 32 years
  B.S. Chemistry, University of the Philippines, 1991

  Ms. Cuenco has over 32 years of environmental laboratory and data validation experience under DoD and EPA guidelines. Her experience includes performance of data validation in gas chromatography/mass spectrometry for volatile and semivolatile organics and extensive Navy and EPA data review and data verification for all organic and inorganic analyses. Her laboratory experience includes hands-on CLP and SW-846 GC/MS methods.

- **Pei Geng, Senior Chemist/Project Manager**
  Project Role: Senior Organic Data Validator/Project Manager
  Data Validation Experience: 25 years
  Overall Laboratory and Data Validation Experience: 32 years
  M.S. Chemistry, Sam Houston University, 1989

  Ms. Geng will perform the role of day to day Project Manager for this project. She will monitor schedules, compliance of validation to the Required Guidelines, perform routine surveillance activities such as generation of non-conformance reports, validator training and QA reports to management.

  Ms. Geng will perform the role of organic data validator for this project. She will perform data validation for GC/MS and gas chromatography analyses and serve as a peer reviewer in the initial validation review process.

  Ms. Geng has over 31 years of environmental laboratory and data validation experience. Her experience includes performance of data validation in the gas chromatography area for volatile and semivolatile organics and extensive DoD data review and data verification for all organic analyses. Her laboratory experience includes hands-on CLP and SW-846 GC/MS methods.

- **Michael Giangiordano, Chemist/Project Manager**
  Project Role: Project Management Assistance
  Data Validation Experience: 8 years
  Overall Laboratory and Data Validation Experience: 22 years
  B.S. Kinesiology, pending, San Diego State University, San Diego, CA

Mr. Giangiordano has 8 years of experience at LDC and specializes in supporting the company's custom software products. Mr. Giangiordano has a thorough knowledge and understanding of the company's branded software and has led numerous workshops and training sessions for clients ranging from laboratory personnel to consulting firms to USACE. He has extensive experience in electronic data deliverables and electronic data deliverable review and provides database support and management solutions for clients using LDC's custom environmental database management system (EDMSi).

Mr. Giangiordano has 14 years of environmental laboratory. His experience includes Project Manager at EnviroMatrix Analytical, Inc., an accredited full service environmental analytical chemistry facility, Mr. Giangiordano oversaw projects that provided analytical services and support to clients ranging from environmental consulting firms to marine biology firms, in addition to waste and wastewater treatment and disposal firms and municipalities. Mr. Giangiordano was also the Supervisor of the WET Chemistry and Microbiology Departments at EnviroMatrix Analytical, Inc. where he was responsible for all department functions which included overseeing daily operations, training staff, final reporting of analytical data, compliance with method requirements, as well as introducing and developing new methods for additional accreditation.

An Le, Inorganic Chemist
Project Role: Inorganic Data Validator
Data Validation Experience: 5 years
Overall Laboratory and Data Validation Experience: 23 years
B.S. Biological Science, 2000, University of California, Irvine

Ms. Le has over 23 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation using USEPA National Functional Guidelines, client Quality Assurance Program documents, and the Department of Defense QSM depending on the project requirements for the clients.

Ms. Le was a Wet Chemistry Analyst at TestAmerica Laboratories, Ms. Le performed analysis of an extensive list of wet chemistry analyses. Ms. Le also performed volatile organic compounds analysis according and was also responsible for training new analyst employees and performing second level review of data.

Judy Ecklund, EDD Specialist
Project Role: Electronic Data Entry (EDD)
EDD Experience: 14 years

Ms. Ecklund specializes in Electronic Data Deliverables and is familiar with a variety of deliverable formats, including but not limited to NEDD, EQUIS, and SEDD. Ms. Ecklund is also an expert in submitting data to NIRIS the Navy database.

Ms. Ecklund has over 31 years combined environmental laboratory and validation related experience. Her experience includes working with electronic data deliverables (EDDs) as well as performing database uploads.

- **Tony Rommelfanger, Data Control Manager**
  Project Role: Data Custodian

Mr. Rommelfanger will perform the role of data custodian for this project. He will perform the log-in of all data packages into the LDC tracking system. This system will generate spreadsheets for identifying all samples, their collection date, analysis performed, matrix, and report due date. Upon the completion of each delivery order, he will archive and catalog all reports and data in a secured storage area.

Mr. Rommelfanger has over 31 years of experience in laboratory and data management experience. He has experience in organizing, logging in, and tracking data packages for technical staff.

Resumes of Key Staff

- Stella Cuenco, Senior Chemist
- Pei Geng, Senior Chemist
- Michael Giangiordano, Chemist
- An Le, Inorganic Chemist

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RESUME
STELLA S. CUENCO

EDUCATION

B.S. Chemistry, 1991
University of the Philippines (UP)

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
1996 to present

Ceimic Corporation
GC/MS Chemist
1996

Analytical Technologies, Inc.
GC/MS VOA Group Leader
1992 to 1996

Analytical Technologies, Inc.
GC/MS Chemist
1991 to 1992

Natural Products Research, UP
Research Assistant
1990 to 1991

REPRESENTATIVE EXPERIENCE

Ms. Cuenco has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

Specifically, Ms. Cuenco has over 26 years organic data validation experience using USEPA (including Region III) functional guidelines and other applicable documents.

- As senior chemist with LDC, Ms. Cuenco specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.

Ms. Cuenco has over 6 years experience in an environmental laboratory performing the analysis of organic parameters.

- As GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Cuenco performed GC and GC/MS volatile analyses. She was responsible for the final reporting of analytical data for this section.

- As GC/MS VOA Group Leader at Analytical Technologies Inc., a full service environmental analytical chemistry facility, Ms. Cuenco was responsible for all GC/MS functions which included overseeing daily operations, training staff, final reporting of analytical data, and compliance with method requirements.

- As research assistant at Natural Products Research, UP, Ms. Cuenco researched chemical literature for plants with known medicinal properties as well as performed microbiological and pharmacological tests on plant extracts.

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RESUME
PEI GENG

EDUCATION

M.S. Organic Chemistry, 1989
Sam Houston State University

B.S. Environmental Chemistry, 1983
Nankai University

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
1997 to present

Ceimic Corporation
GC/MS and GC Chemist
1996 to 1997

PACE Analytical Service Inc.
GC/MS and GC Chemist
1990 to 1996

REPRESENTATIVE EXPERIENCE

Ms. Geng has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

Specifically, Ms. Geng has over 25 years organic data validation experience using USEPA CLP (including Region III) functional guidelines and other applicable documents.

- As chemist with LDC, Ms. Geng specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.

Ms. Geng has over 7 years of experience in an environmental laboratory performing the analysis of organic parameters.

- As both a GC and GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses.

- As both a GC and GC/MS chemist at PACE Analytical Service Inc., a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses as well as overseeing the final reporting of analytical data, and compliance with method requirements.

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RESUME
MICHAEL D. GIANGIORDANO

EDUCATION

B.S. Kinesiology, pending
San Diego State University, San Diego, CA

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Sr. Environmental Informatics & Software Support Specialist
2016 to present

EnviroMatrix Analytical, Inc.
Project Manager
2005-2015

Laboratory Supervisor
2003 to 2015

Laboratory Technician
2001 to 2003

REPRESENTATIVE EXPERIENCE

Mr. Giangiordano has over 22 years combined environmental laboratory and data management experience and possesses certifications as a Project Management Professional (PMP) and Scrum Master as well as a Laboratory Analyst. Mr. Giangiordano came to Laboratory Data Consultants, Inc. with over 14 years of hands-on environmental laboratory experience at an accredited full service environmental analytical chemistry facility and now specializes in supporting the company's custom software products.

- As Senior Environmental Informatics & Software Support Specialist with LDC, Mr. Giangiordano has a thorough knowledge and understanding of the company's branded software and has led numerous workshops and training sessions for clients ranging from laboratory personnel to consulting firms to USACE. Mr. Giangiordano specializes in tending to client software and electronic data deliverable needs and provides technical support throughout the life of LDC's various custom software products. He has extensive experience in electronic data deliverables and electronic data deliverable review and provides database support and management solutions for clients using LDC's custom environmental database management system (EDMSi).

- As a Project Manager at EnviroMatrix Analytical, Inc., an accredited full service environmental analytical chemistry facility, Mr. Giangiordano oversaw projects that provided analytical services and support to clients ranging from environmental consulting firms to marine biology firms, in addition to waste and wastewater treatment and disposal firms and municipalities. During this time, Mr. Giangiordano also served as liaison to US military in designing a wastewater compliance infrastructure that decreased analytical reporting limits and increased equipment capabilities

- As Supervisor of the WET Chemistry and Microbiology Departments at EnviroMatrix Analytical, Inc., Mr. Giangiordano was responsible for all department functions which included overseeing daily operations, training staff, final reporting of analytical data, compliance with method requirements, as well as introducing and developing new methods for additional accreditation.

- As an analytical chemist and microbiologist, Mr. Giangiordano performed the analysis of inorganic constituents and bacteriological contamination in drinking water, wastewater, soil, tissue, and sediment and was responsible for the final reporting of analytical data for these sections.

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RESUME
AN LE

EDUCATION

B.S. Biological Science, 2000
University of California, Irvine

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
Feb 2017 to present

TestAmerica Analytical Inc., Irvine, CA
GCMS Analyst
2007 to 2017

EMSL Analytical Inc.
Industrial Hygiene Analyst
2006 to 2007

TestAmerica Analytical Inc., Irvine, CA
Wet Chemistry Analyst
2000 to 2006

REPRESENTATIVE EXPERIENCE

Ms. Le has 6 years of data validation experience.

- As a chemist at LDC, Ms. Le has performed data validation using USEPA National Functional Guidelines, client Quality Assurance Program documents, and the Department of Defense QSM depending on the project requirements for the clients.

Ms. Le has over 17 years of experience working in the lab and performing secondary data review in environmental testing field.

- As a Wet Chemistry Analyst at TestAmerica Laboratories, Ms. Le performed an extensive list of wet chemistry analyses including but not limited to Total Organic Carbon, pH, Conductivity, Biological Oxygen Demand, Total Dissolved Solids, Total Suspend Solids, Alkalinity, and Carbon Dioxide. Ms. Le has also performed Ion Chromatography analysis for Nitrite, Nitrate, Phosphate, Perchlorate, Chromium VI, and used the Spectrophotometer to analyze for Sulfide, Phenol, Chromium VI, Chemical Oxygen Demand (COD), Sulfactants (MBAS), Phosphorous, and Cyanide. As a Gas Chromatography Mass Spectrometry (GCMS) analyst, Ms. Le performed volatile organic compounds analysis according to methods 8260, 5030, 5035, and 624. Ms. Le was also responsible for training new analyst employees and performing second level review of data.

- At EMSL Analytical Inc., Ms. Le performed sample extraction and analysis of samples for metals using inductively coupled plasma (ICP) and flame atomic absorption (GFAA).

Relevant Project Experience

LDC has performed data validation and Quality Assurance services for contaminated sites overseen by AFCEE/AFCEC, Navy Southwest Division, DoE, DoD, EPA Superfund projects overseen by EPA Regions II, III, IV, IX, X, Brown Fields Cleanup for NY Sites, USACE projects reviewed by the Alaska, Baltimore, Louisville, Albuquerque, Seattle, Philadelphia, and Sacramento Districts, and Navy projects reviewed by NFESC.

LDC is the software developer and expert in the use of the Automated Data Review (ADR) software. LDC has been using the ADR.NET version and has the current Version in full implementation. LDC has performed over 1000 ADR projects in the past 10 years' worth over $2,000,000 in revenue. ADR clients include, but are not limited to: Tetra Tech EC, Sealaska, AMEC, EPA, California DTSC, MWH, Trevet, Brown & Caldwell, AECOM, Shaw, ITSI, CDM, Weston Solutions and the San Gabriel Watermaster.

LDC has validated over 1,000,000 samples for analyses such as volatile organics (CLP, EPA Method 8240/8260), semivolatile organics (CLP, EPA Method 8270), organochlorine pesticides/PCBs (CLP, EPA Method 8081/8082), chlorinated herbicides (EPA Method 8151), purgeable halocarbons and aromatics (EPA Method 8021), trace metals (CLP, EPA Method 6010/6020/7000), PAHs by EPA 8310 and 8270,TOC analyses, hexavalent chromium, total petroleum hydrocarbons (EPA Method 8015/CDOHS LUFT), radiochemical constituents including gross alpha/beta, alpha spec, gamma spec, tritium, and uranium, and general minerals.

LDC has met their contractual turnaround time and quality requirements on over 99% of the projects completed.

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Project References/Experience

Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value ($)	Start/Stop
SESI Consulting Engineers 12A Maple Avenue Pine Brook, NJ 07058 ATTN: Mr. Steven Gustems Office: 862-702-5728 Mobile:973-518-8547 Email: ssg@sesi.org	Huguenot Street Development, 33 Centre Avenue, New Rochelle, NY NYSDEC sites LDC performed Category B equivalent data validation Analyses included: VOC, SVOC, Pesticide, PCBs, PFAs, Metals, Wet Chemistry	Category B data validation, EDD Population, and NYSDEC DUSR reports	>1,000 Soil, Water, and Air	$38872.24	12/2019-present
AECOM 1001 Bishop Street Suite 1600 Honolulu, HI 96813 ATTN: Ms. Alethea Ramos Office: 1-808-529-7283 Mobile: 1-808-389-5383 Email: alethea.ramos@aecom.com	Red Hill Bulk Storage Facility, CTO 18F0126 Data validation per Stage 2B and Stage 4 guidelines for volatile organic, semivolatile organic, pesticides/PCBs, herbicides, phenols, phosphorus pesticides, dioxin, trace metal, and wet chemistry analyses in soil, water, and tissue matrices. (Navy CLEAN IV, Honolulu, HI)	Stage 2B and 4 data validation reports, EDD, and DQAR reports	>2,000 samples Soil and Water	$72,283.89	9/2018-present
EA Engineering 225 Schilling Circle Hunt Valley, MD 21031 ATTN: Ms. Tara Office:410-584-7000 ext. 5172 Direct Dial: 410-329-5172 Email: Lamondtlamond@eaest.com	6332103 Off-Base Drinking Water Site Inspection, USACE Omaha PFAS Mitigation Various AFBs Data validation per Stage 2B and Stage 4 guidelines for PFAs analyses in soil and water, and tissue matrices.	Stage 2B and 4 data validation reports and EDD	>500 samples Soil and Water	$10,787.60	4/2020-present

Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value ($)	Start/Stop
EA Engineering 225 Schilling Circle Hunt Valley, MD 21031 Project Manager ATTN: Ms. Brenda 615 Piikoi Street, Honolulu, HI 96814 Office: (808) 589-1455, x102 Fax: (808) 589-1575 Mobile: (808) 256-8268 E-mail: bnuding@eaest.com Nudingbnuding@eaest.com	Fairchild AFB LDC performed Stage2B and 4 data validation for PFAs and Wet Chemistry analyses and EDD population.	Stage 2B and 4 data validation reports. Work conducted under Working Copy Quality Assurance Project Plan for Environmental Remediation Services FAFB and PFAS Fairchild Air Force Base, Spokane County, Washington (July 2019) and the USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFAS) Analyzed Using EPA Method 537 (November 2018).	>400 Water	$6,727	08/2019-present
Cape Inc. 500 Pinnacle Court, Suite 100 Atlanta, GA 30071 ATTN: Mr. Wayne Vermeychuk wvermeychuk@cape-inc.com Office: 727.940.4713 Mobile: 678.492.9384	Mather AFB LDC performed Level II and IV data validation for a full suite of analyses including GCMS, GC, Metals, and Wet Chemistry analyses and ERPIMS EDD Upload.	Level II and IV data validation reports. Work conducted under Draft Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) for Environmental Services for Western Region Base Realignment and Closure (BRAC) Bases, Mather Air Force Base (AFB), California (February 2017), the DoD QSM 5.2 (2018), and a modified outline of the USEPA NFG.	>1700 Water and Air	$55,142	02/2017-present

Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value ($)	Start/Stop
Ayuda Companies 410 Acoma Street Denver, CO 80204 ATTN: Susan Royse Office: 303.999.2146 Fax: 303.999.2099 sroyse@ayudacompanies.com	Various Omaha AFB Sites LDC performed Level III and IV data validation for a PFAs analyses and ADR and SEDD population, and ERPIMS EDD Upload.	Level III and IV data validation reports. Work conducted under Addendum 3 to the Final Uniform Federal Policy – Quality Assurance Project Plan for Site Inspection of Aqueous Film-Forming Foam Areas, United State Air Force Academy (July 2018), the DoD QSM) 5.1 (2017), and the DoD General Validation Guidelines (February 2018).	>360 Water and Soil	$8434	02/2017-present
Washington State Department of Transportation Environmental Services Office P.O. Box 47332 Olympia, WA 98504 ATTN: Mr. Brad Archbold ArchboB@wsdot.wa.gov 360-570-6636	WSDOT NPDES Stormwater Monitoring LDC performed Stage2A, 2B and 4 data validation for a full suite of analyses including GCMS, GC, Metals, and Wet Chemistry analyses.	Stage 2A, 2B, and 4 data validation reports. Work conducted under Washington State Department of Transportation Stormwater Monitoring	>3,800 Soil and Water	$48,332	04/2013-07/2016
Leighton Consulting, Inc. 17781 Cowan Irvine, CA 92614 ATTN: Mr. Mark Withrow mwithrow@leightongroup.com cell: 949-394-2194 office: 949-681-4211	San Onofre Nuclear Generating Station (SONGS) Mesa Facility LDC performed EPA Level III and IV equivalent data validation for a full suite of analyses. Analyses included GCMS, GC, Metals, and Wet Chemistry analyses.	EPA Level III and IV data validation reports. Work conducted under USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG).	>3,600 Soil, Water, and Air	$149,714	09/2015-present
Leighton Consulting, Inc. 17781 Cowan Irvine, CA 92614 ATTN: Ms. Julie Harriman jharriman@leightongroup.com Direct : (949) 681-4264 Cell: (949) 572-8129	Aliso Canyon LDC performed EPA Level II equivalent data validation. Analyses included VOA, SVOA, Total Hydrocarbons, Isopropyl Alcohol, Total Dust, and Sulfur Compounds.	EPA Level II data validation reports and PARCC summary report. Work conducted under USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG).	>1,200 Air, Wipe, and Disk	$15,749	07/2016-08/2016

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Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value ($)	Start/Stop
Tetra Tech, EM Inc. 1999 Harrison Street, Suite 500 Oakland, CA 94612 ATTN: Ms. Sara Woolley Sara.Woolley@tetratech.com Direct: 510.302.6311 Main: 510.302.6300	Subcontract 161408 For Various project sites including: EAGLE NEST INVESTIGATION FORT IRWIN GOLD BEACH MILL HPNS MARE ISLAND MOTCO LITIGATION NAF EL CENTRO NWS CONCORD LDC performed Cursory and Full data validation for a full suite of analyses using specified EPA Guidelines, DoD QSM Version 4.2, and Tetra Tech EMI, Inc. validation documents.	TTEMI Format data validation reports and EDD using Tetra Tech's validate program.	>3000 Soil and Water	$39,785	10/2011 – 10/2013
GEI Consultants, Inc. 455 Winding Brook Drive Glastonbury, CT 06033 (860) 368-5342 direct (860) 368-5300 main Jaimie Wargo JWargo@geiconsultants.com	Various NYSDEC sites LDC performed Category B equivalent data validation Analyses included: VOC, SVOC, Pesticide, PCB, Herbicide, Steroids, Metals, Wet Chemistry	Category B data validation and NYSDEC DUSR reports	>1,700 Soil and Water	$72,000	2010-present
TetraTech EC 17885 Von Karman Ave, Suite 500 Irvine, CA 92614 Attn: Lisa Bienkowski (949) 809-5028 Lisa.Bienkowski@tetratech.com	Tetra Tech Hunter's Point CA LDC performed EPA Level III and IV equivalent data validation for a full suite of analyses on more than 50,000 soil and water samples. Analyses included tritium, isotopic thorium, uranium and plutonium, and gross alpha/beta. Expedited turnaround times were included (5 day TAT)	EPA Level III and IV data validation reports. Work conducted under US Navy RAC program, Southwest Div.	>50,000 Soil and Water	$645,733	02/2001-present
AECOM (Earth Tech) 700 Bishop Street Honolulu, HI 96813 Contact: Scott Lewis (808) 523-8874 Scott.Lewis@aecom.com	Data validation per EPA level "3/C" and "4/D" guidelines for volatile organic, semivolatile organic, pesticides/PCBs, herbicides, phenols, phosphorus pesticides, dioxin, radiochemical, and trace metal analyses in soil, water, and tissue matrices. (Navy PACDIV CLEAN, Honolulu, HI)	LDC worksheets and validation reports	>10,000 samples Water/Soil/Air	$750,000	4/98-present

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Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value ($)	Start/Stop
CBI (formerly Shaw E&I) 3347 Michelson Drive, Ste 200 Irvine, CA 92612 Contact: Mr. Dwayne Ishida Phone: (949) 660-7561 Dwayne.Ishida@CBIFederalServices.com	Data validation per EPA level "3" and "4" and AFCEE/AFCEC guidelines for volatile organic, semivolatile organic, pesticides/PCBs, herbicides, phenols, phosphorus pesticides, dioxin, radiochemical, and trace metal analyses in soil, water, and tissue matrices. (Navy Southwest Division RAC, San Diego, CA and various AFCEE/AFCEC projects)	LDC worksheets and validation reports	>5000 samples Water/Soil/Air	$350,000	6/06-present
Santa Clara Pueblo Office of Environmental Affairs 578 Kee Street Espanola, New Mexico, 87532 Ms. Ernestine Naranjo 505-692-6270 phone 505-747-2728 fax enaranjo@santaclarapueblo.org	Data validation per EPA level "III" SCP-OEA-DEPO, Data Validation using ADR For full suite of Organic, Inorganic, and Radiochemical analyses. Radiochemical analyses including Gross alpha & beta, Gamma Spectroscopy, Iodine, Radium-226/228, Strontium-90, Isotopic Pu, Th, and U, Tritium, and Americium by various EPA and GA methods.	Level III validation using ADR	>2000 Soil, Water, and Air	$78621	12/2015 - present
Anchor Environmental, LLC 720 Olive Way, Suite 1900 Seattle, WA 98101 Ms. Joy Dunay 206.287.9130, jdunay@anchorqea.com	Data validation per Level “C” Newtown Creek Phase 2: Third Party Data Validation of laboratory results, EDD population, and Data Quality Assessment Reports (DQAR) for various methods Subcontractor	LDC worksheets and validation reports	>63,000 Soil and Water	$743,793.88	6/14-1/16
P.W.Grosser Consulting2015 630 Johnson Ave, Suite 7 Bohemia, NY 11716 Attn: Mr. Derek Ersbak w. 631.589.6353 f. 631.589.8705 dereke@pwgrosser.com	Former Arkansas Chemical Co.Site and Former Ronkonkoma Wallpaper Site 203 Jay St. LDC performed Category B equivalent data validation Analyses included: VOC, SVOC, Pesticide, PCB, Metals, Wet Chemistry	Category B data validation and NYSDEC DUSR reports	>200 Soil and Water	$3,024.00	11/2014-present
Amec Foster Wheeler Environment and Infrastructure, Inc. 9210 Sky Park Court, Suite 200 San Diego, CA 92123 Attn: Mr. Rolf Schottle rolf.schottle@amecfw.com Tel +1 (858) 300 4300, Fax +1 (858) 300 4301, Direct +1 (858) 300 4323	Regional Harbor Monitoring Program (RHMP), San Diego, California Third party validation of LDC performed EPA Level III and IV equivalent data validation for a full suite of analyses.	LDC worksheets and validation reports	>200 Water	$9,011.40	3/15–6/16

Note: All above projects were 100% self-performed by LDC

APPENDIX Q-C

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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

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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.

APPENDIX G – HEALTH AND SAFETY PLAN

204 4TH AVENUE
BROOKLYN, NEW YORK 11217
NYSDEC BCP SITE: C224295
BLOCK: 343, LOT: 35

SITE MANAGEMENT PLAN
HEALTH AND SAFETY PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

ON BEHALF OF:

204 4th Avenue, LLC.
51 East 12th Street, 7th Floor
New York, New York 10003

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
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Ryan Morley, Project Manager ryanm@pwgrosser.com

PWGC Project Number: AHI2005

AUGUST 2023

P.W. GROSSER CONSULTING INC.
PROJECT No. AHI2005

HEALTH AND SAFETY PLAN

204 4th AVENUE
BROOKLYN, NEW YORK 11217
BCP Site # C224295

Submitted:
August 2023

Prepared for:
The New York State Department of Environmental Conservation
Division of Environmental Remediation

On behalf of:
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51 East 12th Street, 7th Floor
New York, New York 10003

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Bohemia, New York 11716
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204 4th AVENUE, BROOKLYN, NEW YORK 11217
NYSDEC BCP ID C224295
HEALTH AND SAFETY PLAN

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1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological and physical hazards during post-remedial activities at 204 4th Avenue in Brooklyn, New York, if such activities occur. P.W. Grosser Consulting Inc.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological and chemical hazards.

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2.0 INTRODUCTION

2.1 Purpose

This HASP addresses the minimum health and safety practices that will be employed by site workers participating in post-remedial activities, if necessary, at the project site located at 204 4th Avenue, Brooklyn, New York.

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting, Inc. (PWGC), its' subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. PWGC sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to PWGC for review and acceptance.

Activities performed under this HASP will comply with applicable parts of Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 CFR Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM). A copy of this HASP will be maintained on-site during all work activities.

Refusal to comply with the HASP or violation of any safety procedures by field personnel may result in their immediate removal from the site following consultation with the HSM and the Field Team Leader (FTL).

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3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

3.1 Project Manager

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before site work is conducted; and
- Has the overall project responsibility for project health and safety.

3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO)

- Ensures that the HASP is implemented in conjunction with the Health and Safety Manager (HSM);
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the HSM is informed of project changes that require modifications to the HASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the site safety briefing;
- Reports to HSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

3.3 Health and Safety Manager

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

3.4 Site Personnel

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.

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4.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during SMP monitoring activities and/or soil disturbing events. Additional information can be found in **Appendix A** - Material Safety Data Sheets or in **Appendix B** - Activity Hazard Analyses.

4.1 Chemical Hazards

Soil and groundwater beneath the site contain residual gasoline spill impacts stemming from the former presence of a gasoline station, as well as historic fill which is impacted with semi-volatile organic compounds (SVOCs) and heavy metals. Off-gassing of volatile organic compounds (VOCs) stemming from residual gasoline impacts is also a potential hazard.

The chemicals identified above may have an effect on the central nervous system, respiratory system and may cause chronic liver and kidney damage. Acute exposure symptoms may include headache, dizziness, nausea, diarrhea and skin and eye irritation.

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4.2 Biological Hazards

Work will be performed in a highly urban area within the City of New York. Potential exists for workers to come into contact with biological hazards such as animals, insects and plants. The Activity Hazard Analyses found in **Appendix B** includes specific hazards and control measures for each task, if applicable.

4.2.1 Animals

Sites are located in predominantly commercial/urban areas. It is unlikely that significant amounts of wildlife will be encountered. However, workers shall use discretion and avoid contact with animals, if necessary.

4.2.2 Insects

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution must be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long sleeved shirts. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles). If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it and report to the clinic with the tick.
- Use insect /tick repellents that contain the chemical DEET (n,n-Diethyltoluamide). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF.

4.2.3 Plants

Hazardous plants such as poison ivy and poison oak may be present at the site. In the event that these plants are present, the FTL/SHSO should identify susceptible individuals and workers shall avoid contact with these plants.

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4.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analyses (AHA) in **Appendix B** for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this HASP.

4.3.1 Temperature Extremes

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix C**.

4.3.2 Steam, Heat and Splashing

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

4.3.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

4.3.4 Fire and Explosion

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job site. If these conditions occur no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

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4.3.5 *Manual Lifting/Material Handling*

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common work place injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

4.3.6 *Slips, Trips and Falls*

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma or back injuries.

4.3.7 *Heavy Equipment Operation*

An excavator/backhoe will be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

4.3.8 *Electrocution*

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

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5.0 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. The AHAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

AHAs have been developed by PWGC for the following phases of work:

1. Site Mobilization/Demobilization.
2. Excavation.
3. Soil and Groundwater sampling.
4. Decontamination.

Copies of these AHAs are included in **Appendix B** of this HASP.

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6.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) specified in **Table 7-1** represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and **Appendix B** - Activity Hazard Analyses. For the purposes of PPE selection, the HSM and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by **Table 7-1**, the FTL/SHSO will conduct the hazard assessment, select the PPE, and document changes in the appropriate field logs. PPE selection will be made in consultation with the HSM.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the HSM and changes documented accordingly. If major modifications occur, the HSM will notify the PM.

6.1 PPE Abbreviations

HEAD PROTECTION	EYE/FACE PROTECTION	FOOT PROTECTION
HH = Hard Hat	APR = Full Face Air Purifying Respirator	Neo = Neoprene
		OB = Overboot
HEARING PROTECTION	MFS = Mesh Face shield	Poly = polyethylene coated boot
EP = ear plugs	PFS =Plastic Face shield	Rub = rubber slush boots
EM = ear muffs	SG = ANSI approved safety glasses with side shields	STB = Leather work boots with steel toe

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HAND PROTECTION	BODY PROTECTION	RESPIRATORY PROTECTION
Cot = cotton	WC = work clothes	APR = Full-face air purifying respirator with organic vapor cartridges
But = Butyl	Cot Cov = Cotton Coveralls	
LWG = Leather Work Gloves	Poly = Polyethylene coated Tyvek® coveralls	ASR = Full face air supplied respirator with escape bottle
Neo = Neoprene	Saran = Saranex coated coveralls	SCBA = Self-contained breathing apparatus
Nit = Nitrile	Tyvek® = Uncoated Tyvek® coveralls	
Sur = Surgical		

6.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical present.
- Work operations to be performed.
- Potential routes of exposure.
- Concentrations of contaminants present.
- Characteristics, capabilities and limitations of PPE and any hazard that the PPE presents or magnifies.

A review of the analytical data from previous sampling events indicates that VOCs, SVOCs, and/or metals soil, groundwater, and soil vapor beneath the site are the primary contaminant of concern.

Exposure routes for these chemicals include are inhalation, skin absorption, skin/eye contact and ingestion. Chemical protective gloves will be required for all activities that involve sample handling and the likelihood for skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

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Table 7-1

Personal Protective Equipment Selection

TASK	HEAD	EYE/FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR
Mobilization/ Demobilization	HH	SG	STB	WG	WC	None	None
Excavation, loading and backfilling	HH	SG	STB	WG	WC	EM or EP	None initially APR if action levels exceeded
Drilling Activities	HH	SG	STB	WG	WC	EM or EP	None initially APR if action levels exceeded
Soil/GW sampling	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceeded
Decontamination	HH	SG	STB	Nit + Sur	WC, Tyvek® as needed	None	None initially APR if action levels exceeded

6.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

1. Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first; and
2. If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short of time period they were used the day before.

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants.
- Using the Rule of Thumb provided by the AIHA.
- All of the chemicals have boiling points greater than 70°C.
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm.
- The humidity is expected to be less than 85%.
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (e.g., overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

Type of contaminant(s);

- Contaminant concentration.
- Relative humidity.
- Breathing rate; Temperature; Changes in contaminant concentration, humidity, breathing rate and temperature.
- Mixtures of contaminants.
- Accuracy in the determination of the conditions.

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- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;
- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;
- User training, experience and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

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7.0 ZONES, PROTECTION AND COMMUNICATION

7.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work site when operations begin.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to site contaminants exists, will only be allowed access after providing the FTL/SHSO with proper training and medical documentation.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

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

Contamination Reduction Zone **-** The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone **-** All activities, which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels

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of protection may be employed or different hazards exist. The size of the EZ shall be determined by the site HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

7.2 Contamination Control

Decontamination areas will be established for the following activities.

- Drilling/Sampling Activities
- Excavation

7.2.1 Personnel Decontamination Station

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.

All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

7.3 Communication

- Each team member will have a Nextel cell phone/radio for communication with the PM, HSO and other team members during field activities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

SIGNAL	MEANING
Hand gripping throat	Out of air, can't breathe
Grip on a partner's wrist or placement of both hands around a partner's waist.	Leave the area immediately, no debate.
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand.
Thumbs down	No, negative.

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8.0 MEDICAL SURVEILLANCE PROCEDURES

All contractor and subcontractor personnel performing field work where potential exposure to contaminants exists at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

8.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the HSM before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the HSM in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

8.2 Medical Data Sheet

A medical data sheet is provided in **Appendix D**. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

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9.0 SAFETY CONSIDERATIONS

9.1 General Health and Safety Work Practices

A list of general health and safety work practices is included as an included in **Appendix E**. The work rules will be posted in a conspicuous location at the site.

9.2 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

9.3 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and packaged as to prevent spillage or breakage. Sample containers shall be decontaminated in the CRZ or EZ before entering a clean Support Zone area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling, in order to assure that the practices are appropriate for the suspected contaminants in the sample.

9.4 Drill Rigs

When conducting drilling activities, the opportunity of encountering fire and explosion hazards exists from underground utilities and gases. The locations of underground utilities will be verified prior to performing any intrusive activities. Additionally, because of the inherently hazardous nature of drilling operations, safety and accident prevention are crucial when drilling operations are performed. Most drilling accidents occur as a direct result of lack of training and supervision, improper handling of equipment, and unsafe work practices. Hazards include: assembling and disassembling rigs, rotary and auger drilling, and grouting. The drilling contractor shall perform drilling in accordance with its own Health & Safety Program for Drill Rig Safety.

9.4.1 Safety During Drilling Operations

- Safety requires the attention and cooperation of every worker and site visitor.
- Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick), look up to check for overhead obstructions.
- Maintain a minimum of 15 feet clearance from all overhead electric lines.

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- Before raising the mast (derrick), all drill rig personnel (with the exception of the operator) and visitors shall be cleared from the areas immediately to the rear and the sides of the mast. All drill rig personnel and visitors shall be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. Lower the mast (derrick) only when the leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.
- The operator of a drill rig shall only operate a drill rig from the position of the controls.
- Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line shall be used.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a drill rig or while on the job.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors, or animals form stepping or falling into the hole.
- Terminate drilling operations during an electrical storm and move the entire crew away from the drill rig.

9.5 Excavation

Although extensive excavation is not anticipated for the scope of this project, excavations will be conducted in accordance with the requirements contained in 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems; and training.

The Competent Person will be the FTL or other designee with appropriate training and experience. The Competent Person will be assisted in his/her duties by other technical personnel such as the HSM, geologists, structural engineers and soils engineers.

No entry into excavations will be allowed for this phase of the project.

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10.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

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11.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures which are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

11.1 Responsibilities

11.1.1 Health and Safety Manager (HSM)

The HSM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

11.1.2 Field Team Leader/Site Health and Safety Officer (FOL/HSO)

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The FTL/SHSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can ensure that OSHA is notified within the required time frame. The HSM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours.

11.1.3 Emergency Coordinator

The Emergency Coordinator for the project is the FTL/SHSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the emergency coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The emergency coordinator will locate emergency phone numbers and identify hospital routes prior to beginning work on site. The emergency coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

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11.1.4 Site Personnel

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency.

11.2 Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

11.2.1 Hand Signals

Downrange field teams will employ hand signals where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

11.2.2 Field Radios and Cell Phones

PWGC field personnel are provided cellular phones with telephone and two-way radio capabilities for site communication and emergency use.

11.3 Local Emergency Support Units

A route map from the site to the nearest hospital can be found in **Appendix F**. This map will be placed with the above emergency telephone numbers in all on-site vehicles.

11.4 Pre-Emergency Planning

PWGC will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency. Before fieldwork on the site commences, each person who will be working there or observing the operations will complete a medical data sheet (**Appendix D**). These data sheets will be filled out during site-specific training and will be kept on the site.

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In the event of an incident where a team member becomes exposed or suffers from an acute symptom of exposure to site materials and has to be taken to a hospital, a copy of his/her medical data sheet will be presented to the attending physician.

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Table 13-1

Emergency Telephone Numbers

Contact	Firm or Agency	Telephone Number
Police		911
Fire		911
Hospital	Jamaica Hospital Medical Center	(718) 206-6000
Ambulance		911
Project Manager/Health and Safety Manager	Ryan Morley PWGC	(631) 589-6353
Field Team Lead/Site Health & Safety Officer	Ryan Morley PWGC	(631) 589-6353
NYSDEC Site Contact	Steven Wu	(718) 482-6725
Poison Control Center		(800) 962-1253
Chemtrec		(800) 424-9300

11.5 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the FTL/SHSO immediately. First aid equipment will be available on site at the following locations:

- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash: Support Zone (or designated by FTL/SHSO upon arrival)

During site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-

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response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least two people with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance. **A map and directions to the hospital can be found in Appendix F.**

11.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

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After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places and the location of emergency equipment will be posted in all trailers and used during site-specific training.

11.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

11.7.1 Fire Prevention

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.

11.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

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SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

11.9 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The FTL/SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

11.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Health and Safety Manager;
- Project Manager; and
- The employer of any injured worker who is not a PWGC employee.

Written confirmation of verbal reports are to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in **Appendix G**. If the employee involved is not a PWGC employee, his employer will receive a copy of the report.

11.11 Adverse Weather Conditions

In the event of adverse weather conditions, the FTL/SHSO will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds);
- Limited visibility (fog);
- Potential for electrical storms;
- Earthquakes; and
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The FTL/SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

11.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity and amounts of major spill components;
- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;

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- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

11.13 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

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12.0 TRAINING

12.1 General Health and Safety Training

In accordance with PWGC corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

12.1.1 Three Day Supervised On the Job Training

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

12.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 1910.120 requirements and related company programs and procedures.

12.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

12.4 On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily Briefing Sign-In Sheet is contained in **Appendix H**. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new

activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

12.5 First Aid and CPR

The HSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is anticipated that a minimum of one field person on-site at any one time will have first aid and CPR training. The training will be consistent with the requirements of the American Red Cross Association or American Heart Association. If none are available on-site, then the HSM shall be notified.

12.6 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized training in accordance with 29 CFR 1910.120.

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13.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety log book and as appropriate, the HSM and/or PM will be notified. Daily tailgate meetings will be documented in the H&S log book as well as personnel on-site.

13.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

13.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in **Appendix G**.

13.3 Health and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

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14.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

Name (Print and Sign)	***Date***

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APPENDIX A
CHEMICAL DATA SHEETS

Lead

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 12/15/2014 Revision date: 12/15/2014 Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance

CAS No : 7439-92-1

Formula : Pb

Synonyms : C.I. 77575, in massive state / elemental lead, in massive state / glover, in massive state

BIG no : 10073

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Solder
Battery: component
Construction
Electrodes

1.3. Details of the supplier of the safety data sheet

GSC International, Inc.
1747 N. Deffer Drive
Nixa,
MO 65714
United States of America

Tel: 417-374-7431
Fax: 417-374-7442
Email: info@gscinternationalinc.com

1.4. Emergency telephone number

Country	Organization/Company	Address	Emergency number
MEXICO	Servicio de Informacion Toxicologica Sintox	Tintoreto #32 Edif. a Desp. Col. Nochebuena Mixcoac México, D.F.	1 800 009 2800 +52 55 5611 2634 /+52 55 5598 9095
UNITED STATES OF AMERICA	American Association of Poison Control Centers		1-800-222-1222

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 4 (Oral)	H302
Acute Tox. 4 (Inhalation)	H332
Carc. 1B	H350
Repr. 1A	H360
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS07 GHS08 GHS09

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H302+H332 - Harmful if swallowed or if inhaled
H350 - May cause cancer
H360 - May damage fertility or the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure

H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe dust, fume
P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P314 - Get medical advice/attention if you feel unwell
P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification (GHS-US)
Lead (Main constituent)	(CAS No) 7439-92-1	> 99,9	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Carc. 1B, H350 Repr. 1A, H360 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures

First-aid measures general : If you feel unwell, seek medical advice. IF exposed or concerned: Get medical advice/attention. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Not applicable. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after skin contact : Not applicable. Wash skin with plenty of water.

First-aid measures after eye contact : Not applicable. Rinse eyes with water as a precaution.

First-aid measures after ingestion : Not applicable. Rinse mouth. Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Adapt extinguishing media to the environment.

Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : DIRECT FIRE HAZARD. Non combustible.

Explosion hazard	:	DIRECT EXPLOSION HAZARD. No data available on direct explosion hazard. INDIRECT EXPLOSION HAZARD. No data available on indirect explosion hazard.
Reactivity	:	On burning: formation of metallic fumes. Oxidizes on exposure to air.

5.3. Advice for firefighters

Precautionary measures fire	:	Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to heat: have neighborhood close doors and windows.
Firefighting instructions	:	Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.
Protection during firefighting	:	Heat/fire exposure: compressed air/oxygen apparatus. Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	:	Gloves. Protective clothing. See "Material-Handling" to select protective clothing.
Emergency procedures	:	Mark the danger area. No naked flames.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Prevent soil and water pollution. Prevent spreading in sewers. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Not applicable. Collect spillage.
Methods for cleaning up	:	Recover mechanically the product. Pick-up the material. Take collected spill to manufacturer/competent authority. Notify authorities if product enters sewers or public waters.
Other information	:	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Meet the legal requirements. Do not discharge the waste into the drain. Handle unclean empty containers as full ones. Observe strict hygiene. Measure the concentration in the atmosphere. Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust, fume. Use only outdoors or in a well-ventilated area. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Floors, walls and other surfaces in the hazard area must be cleaned regularly.
Hygiene measures	:	Separate working clothes from town clothes. Launder separately. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Does not require any specific or particular technical measures. Comply with applicable regulations.
Storage conditions	:	Store locked up. Store in a well-ventilated place. Keep cool.
Incompatible materials	:	Strong acids, strong bases and oxidation agents.
Heat-ignition	:	KEEP SUBSTANCE AWAY FROM: heat sources.
Prohibitions on mixed storage	:	KEEP SUBSTANCE AWAY FROM: oxidizing agents. Strong acids. Strong bases.
Storage area	:	Meet the legal requirements.
Special rules on packaging	:	SPECIAL REQUIREMENTS: closing. correctly labeled. meet the legal requirements. Secure fragile packaging in solid containers.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Lead (7439-92-1)		
ACGIH	ACGIH TWA (mg/m³)	0,05 mg/m³
ACGIH	Remark (ACGIH)	CNS & PNS impair
OSHA	Not applicable	

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Ensure good ventilation of the work station.

Personal protective equipment : Protective goggles. Gloves.

Materials for protective clothing : GIVE EXCELLENT RESISTANCE: No data available. GIVE GOOD RESISTANCE: butyl rubber. PVC. GIVE LESS RESISTANCE: No data available. GIVE POOR RESISTANCE: No data available.

Hand protection : protective gloves.

Eye protection : Safety glasses.

Skin and body protection : Not required for normal conditions of use.

Respiratory protection : Wear respiratory protection.

Environmental exposure controls : Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Metal.

Molecular mass : 207,20 g/mol

Color : White to blue-grey

Odor : Odorless

Odor threshold : No data available

pH : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Melting point : 327 °C

Freezing point : No data available

Boiling point : 1740 °C

Flash point : Not applicable

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : No data available

Vapor pressure : < 0,1 hPa

Relative vapor density at 20 °C : No data available

Relative density : 11,3

Specific gravity / density : 11340 kg/m³

Solubility : insoluble in water. Substance sinks in water. Soluble in nitric acid. Insoluble in organic solvents. Water: < 0,1 g/100ml

Log Pow : 0,73 (Estimated value)

Log Kow : No data available

Viscosity, kinematic	:	Not applicable
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosive limits	:	No data available

9.2. Other information

VOC content : Not applicable (inorganic)

SECTION 10: Stability and reactivity

10.1. Reactivity

On burning: formation of metallic fumes. Oxidizes on exposure to air.

10.2. Chemical stability

Unstable on exposure to air.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Acids. Bases.

10.6. Hazardous decomposition products

Thermal decomposition generates : fume.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed. Inhalation: Harmful if inhaled.

Lead (\f)7439-92-1	
LD50 oral rat	> 2000 mg/kg body weight (Rat; Weight of evidence)
LD50 dermal rat	> 2000 mg/kg body weight (Rat; Experimental value; OECD 402: Acute Dermal Toxicity)
ATE US (oral)	500,000 mg/kg body weight
ATE US (gases)	4500,000 ppmV/4h
ATE US (vapors)	11,000 mg/l/4h
ATE US (dust, mist)	1,500 mg/l/4h
Additional information	Lead massive metal is not considered to be acutely toxic. It is not easily inhaled or ingested, and if it is accidentally ingested normally passes through the gastrointestinal system without significant absorption into the body. Lead is not easily absorbed through the skin.

Skin corrosion/irritation : Not classified
(Based on available data, the classification criteria are not met)

Serious eye damage/irritation : Not classified
(Based on available data, the classification criteria are not met)

Respiratory or skin sensitization : Not classified
(Based on available data, the classification criteria are not met)

Germ cell mutagenicity : Not classified
(Based on available data, the classification criteria are not met)

Carcinogenicity : May cause cancer.

Lead (7439-92-1)	
Additional information	There is some evidence that inorganic lead compounds may have a carcinogenic effect, and they have been classified by IARC as probably carcinogenic to humans. However, it is considered that this classification does not apply to lead in articles, given the very low bioavailability of metallic lead. Carcinogenicity studies of lead metal powder have been negative. Epidemiology studies of workers exposed to inorganic lead compounds have found a limited association with stomach cancer. IARC has concluded that lead metal is possibly carcinogenic to humans (Group aB).
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	3 - Reasonably anticipated to be Human Carcinogen

Reproductive toxicity : May damage fertility or the unborn child.

Specific target organ toxicity (single exposure) : Not classified

(Based on available data, the classification criteria are not met)

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.

Lead (7439-92-1)	
Additional information	Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Although inhalation and ingestion of lead in massive form are unlikely, poor hygiene practises may result in hand to mouth transfer which maybe significant over a prolonged period of time. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the haemotopoetic (blood) system, kidney function, reproductive function and the central nervous system.

Aspiration hazard : Not classified

(Based on available data, the classification criteria are not met)

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Dangerous for the environment. Very toxic to aquatic life with long lasting effects.

Ecology - air : Not dangerous for the ozone layer (Regulation (EC) No 1005/2009). Not included in the list of fluorinated greenhouse gases (Regulation (EC) No 842/2006). TA-Luft Klasse 5.2.2/II.

Ecology - water : No water pollutant (surface water). Maximum concentration in drinking water: 0.010 mg/l (lead) (Directive 98/83/EC). Highly toxic to aquatic organisms.

Lead (7439-92-1)	
LC50 fish 1	2,8 (0,44 - 542) mg/l (96h) Coughlan, D.J., S.P. Gloss, and J. Kubota 1986. Acute and Sub-Chronic Toxicity of Lead to the Early Life Stages of Small mouth Bass (Micropterus dolomieui). Water Air Soil Pollut. 28(3/4):265-275
EC50 Daphnia 1	4,46 (0,53 - 5,1) mg/l (48h) Govindarajan, S., C.P. Valsaraj, R. Mohan, V. Hariprasad, and R. Ramasubramanian 1993. Toxicity of Heavy Metals in Aquaculture Organisms: Penaeus indicus, Perna viridis, Artemia salina and Skeletonema costatum. Pollut.Res. 12(3):187-189

12.2. Persistence and degradability

Lead (7439-92-1)	
Persistence and degradability	Biodegradability: Not applicable. No (test)data available on mobility of the substance.
ThOD	Not applicable (inorganic)

12.3. Bioaccumulative potential

Lead (7439-92-1)	
Log Pow	0,73 (Estimated value)
Bioaccumulative potential	Low bioaccumulation potential (Log Kow < 4).

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on ozone layer :

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Reuse or recycle following decontamination. Remove to an authorized dump (Class I). Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001).

Additional information : LWCA (the Netherlands): KGA category 05. Hazardous waste according to Directive 2008/98/EC.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN3077 Environmentally hazardous substances, solid, n.o.s. Lead(7439-92-1), 9, III

UN-No.(DOT) : UN3077

Proper Shipping Name (DOT) : Environmentally hazardous substances, solid, n.o.s.
Lead(7439-92-1)

Department of Transportation (DOT) Hazard Classes : 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140

Hazard labels (DOT) : 9 - Class 9 (Miscellaneous dangerous materials)

DOT Symbols : G - Identifies PSN requiring a technical name

Packing group (DOT) : III - Minor Danger

DOT Special Provisions (49 CFR 172.102)	:	8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description “Other regulated substances, liquid or solid, n.o.s.”, as appropriate. In addition, for solid materials, special provision B54 applies. 146 - This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination. 335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as “Environmentally hazardous substances, solid, n.o.s,” UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging. A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg: a. Metal: 11A, 11B, 11N, 21A, 21B and 21N b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2 c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2 d. Fiberboard: 11G e. Wooden: 11C, 11D and 11F (with inner liners) f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner). B54 - Open-top, sift-proof rail cars are also authorized. IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2). IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner. N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle. T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2) TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	155
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	213
DOT Packaging Bulk (49 CFR 173.xxx)	:	240
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	No limit
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	No limit
DOT Vessel Stowage Location	:	A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

Additional information

Other information : No supplementary information available.

ADR

No additional information available

Transport by sea

UN-No. (IMDG)	:	3077
Proper Shipping Name (IMDG)	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Class (IMDG)	:	9 - Miscellaneous dangerous compounds
Packing group (IMDG)	:	III - substances presenting low danger

Air transport

UN-No.(IATA)	:	3077
Proper Shipping Name (IATA)	:	Environmentally hazardous substance, solid, n.o.s.
Class (IATA)	:	9 - Miscellaneous Dangerous Goods
Packing group (IATA)	:	III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Lead (7439-92-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313 Not listed on the United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	10 lb

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Repr. 1A	H360Df
Acute Tox. 4 (Inhalation)	H332
Acute Tox. 4 (Oral)	H302
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Repr.Cat.1; R61
Repr.Cat.3; R62
Xn; R20/22
R33
N; R50/53

Full text of R-phrases: see section 16

15.2.2. National regulations

Lead (7439-92-1)
Listed on IARC (International Agency for Research on Cancer) Listed as carcinogen on NTP (National Toxicology Program)

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date	:	12/15/2014

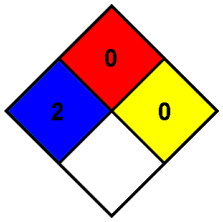
Full text of H-phrases:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H302	Harmful if swallowed
H332	Harmful if inhaled
H350	May cause cancer
H360	May damage fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : * Chronic Hazard - Chronic (long-term) health effects may result from repeated overexposure

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

Personal Protection : B

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

SAFETY DATA SHEET

Creation Date 20-Aug-2014 **Revision Date** 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Mercury (Certified ACS)**

Cat No. : **M141-1LB; M141-6LB**

Synonyms Colloidal mercury; Hydrargyrum; Metallic mercury

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute Inhalation Toxicity - Vapors	Category 2
Reproductive Toxicity	Category 1B
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Central nervous system (CNS), Kidney.	

Label Elements

Signal Word
Danger

Hazard Statements
Fatal if inhaled
May damage the unborn child
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Mercury	7439-97-6	100

4. First-aid measures

General Advice
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation
Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion
Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects
None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. approved class D extinguishers.

Unsuitable Extinguishing Media Water may be ineffective

Flash Point Not applicable
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Very toxic. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Keep product and empty container away from heat and sources of ignition. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Mercury oxide. Toxic fumes.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. No special precautions required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Should not be released into the environment. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Pick up and transfer to properly labelled containers.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Keep in a dry place. Keep away from acids. Incompatible Materials. Strong oxidizing agents. Ammonia. Metals. Halogens.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Mercury	TWA: 0.025 mg/m³ Skin	(Vacated) TWA: 0.05 mg/m³ Ceiling: 0.1 mg/m³ (Vacated) STEL: 0.03 mg/m³ Skin (Vacated) Ceiling: 0.1 mg/m³	IDLH: 10 mg/m³ TWA: 0.05 mg/m³ Ceiling: 0.1 mg/m³	TWA: 0.025 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. None under normal use conditions.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No special protective equipment required.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-38.87 °C / -38 °F
Boiling Point/Range	356.72 °C / 674.1 °F
Flash Point	Not applicable
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	0.002 mmHg @ 25 °C
Vapor Density	7.0
Specific Gravity	13.59 (H2O=1)
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Hg
Molecular Weight	200.59

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Ammonia, Metals, Halogens

Hazardous Decomposition Products Mercury oxide, Toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Mercury	Not listed	Not listed	LC50 < 27 mg/m³ (Rat) 2 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Mercury	7439-97-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects May cause harm to the unborn child.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure Central nervous system (CNS) Kidney

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Mercury	Not listed	0.9 mg/L LC50 96h	Not listed	Not listed

		0.18 mg/L LC50 96h 0.16 mg/L LC50 96h 0.5 mg/L LC50 96h		

Persistence and Degradability Insoluble in water May persist

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Mercury - 7439-97-6	U151	-

14. Transport information

DOT

UN-No	UN2809
Proper Shipping Name	Mercury
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

TDG

UN-No	UN2809
Proper Shipping Name	Mercury
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

IATA

UN-No	UN2809
Proper Shipping Name	Mercury
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

IMDG/IMO

UN-No	UN2809
Proper Shipping Name	Mercury
Hazard Class	8
Packing Group	III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Mercury	7439-97-6	X	ACTIVE	S;12C

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule.

TSCA 12(b) - Notices of Export

Component	CAS No	**TSCA 12(b)** - Notices of Export
Mercury	7439-97-6	Section 5

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Mercury	7439-97-6	X	-	231-106-7	X	X		X	X	KE-23117

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Mercury	7439-97-6	100	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Mercury	-	-	X	X

Clean Air Act

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Mercury	1 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Mercury	7439-97-6	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Mercury	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV -	REACH (1907/2006) - Annex XVII -	REACH Regulation (EC

	Substances Subject to Authorization	Restrictions on Certain Dangerous Substances	1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Mercury	-	Use restricted. See item 18[a]. (see link for restriction details) Use restricted. See item 30. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Mercury	7439-97-6	Listed	Not applicable	Not applicable	0.1% (Max. Conc.)

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Mercury	7439-97-6	Not applicable	Not applicable	X	Annex I - Y29

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 20-Aug-2014
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

1. Identification

Product identifier **UNLEADED GASOLINE**

Other means of identification

SDS number 002-GHS

Synonyms Regular/Premium/Midgrade - Unleaded Gasoline, RFG - Reformulated Unleaded Gasoline, Conventional Unleaded Gasoline, Oxygenated Unleaded Gasoline, Non-Oxygenated Unleaded Gasoline, CARB (California Air Resource Board) Unleaded Gasoline, RBOB - Reformulated Blendstock for Oxygenate Blending, CBOB - Conventional Blendstock for Oxygenate Blending, Petrol, Motor Fuel.
See section 16 for complete information.

Recommended use Motor Fuel
Motor fuels.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Valero Marketing & Supply Company and Affiliates
One Valero Way
San Antonio, TX 78269-6000

General Assistance 210-345-4593

E-Mail CorpHSE@valero.com

Contact Person Industrial Hygienist

Emergency Telephone 24 Hour Emergency 866-565-5220
1-800-424-9300 (CHEMTREC USA)

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Germ cell mutagenicity	Category 1B
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure	Category 2
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Extremely flammable liquid and vapor. Causes skin irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May cause damage to organs (blood, liver, kidney) through prolonged or repeated exposure. May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting// equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe gas/mist/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment.
Response	If exposed or concerned: Get medical advice/attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. In case of fire: Use alcohol-resistant foam, carbon dioxide, dry powder or water fog for extinction. Collect spillage.
Storage	Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Gasoline	86290-81-5	80-100
Toluene	108-88-3	0-30
Hexane (Other Isomers)	96-14-0	5-25
Xylene (o, m, p isomers)	1330-20-7	0-25
Octane (All isomers)	111-65-9	0-18.5
Ethanol	64-17-5	0-10
1,2,4, Trimethylbenzene	95-63-6	0-6
n-Heptane	142-82-5	1-5
Pentane	109-66-0	1-5
Cumene	98-82-8	0-5
Ethylbenzene	100-41-4	0-5
Benzene	71-43-2	0-4.9
n-Hexane	110-54-3	0-3
Cyclohexane	110-82-7	0-3

4. First-aid measures

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Skin contact	Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
Ingestion	Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical attention immediately.
Most important symptoms/effects, acute and delayed	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Cyanosis (blue tissue condition, nails, lips, and/or skin). Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash.

Indication of immediate medical attention and special treatment needed	In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire-fighting measures

Suitable extinguishing media	Water spray. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards arising from the chemical	Vapor may cause flash fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.
Special protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
Fire-fighting equipment/instructions	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Vapors may form explosive air mixtures even at room temperature. Prevent buildup of vapors or gases to explosive concentrations. Some of these materials, if spilled, may evaporate leaving a flammable residue. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.
Specific methods	Use water spray to cool unopened containers.
General fire hazards	Extremely flammable liquid and vapor. Containers may explode when heated.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Local authorities should be advised if significant spills cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas. Use non-sparking tools and explosion-proof equipment. Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.
Environmental precautions	Gasoline may contain oxygenated blend products (Ethanol, etc.) that are soluble in water and therefore precautions should be taken to protect surface and groundwater sources from contamination. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Firefighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802.

7. Handling and storage

Precautions for safe handling

Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Wear personal protective equipment. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is extremely flammable, and explosive vapor/air mixtures may be formed even at normal room temperatures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Benzene (CAS 71-43-2)	STEL	5 ppm
	TWA	1 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Cumene (CAS 98-82-8)	PEL	245 mg/m3
		50 ppm
Cyclohexane (CAS 110-82-7)	PEL	1050 mg/m3
		300 ppm
Ethanol (CAS 64-17-5)	PEL	1900 mg/m3
		1000 ppm
Ethylbenzene (CAS 100-41-4)	PEL	435 mg/m3
		100 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3
		500 ppm
n-Hexane (CAS 110-54-3)	PEL	1800 mg/m3
		500 ppm
Octane (All isomers) (CAS 111-65-9)	PEL	2350 mg/m3
		500 ppm
Pentane (CAS 109-66-0)	PEL	2950 mg/m3
		1000 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	PEL	435 mg/m3
		100 ppm

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Benzene (CAS 71-43-2)	Ceiling	25 ppm
	TWA	10 ppm
Toluene (CAS 108-88-3)	Ceiling	300 ppm
	TWA	200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
1,2,4, Trimethylbenzene (CAS 95-63-6)	TWA	25 ppm
Benzene (CAS 71-43-2)	STEL	2.5 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
	TWA	0.5 ppm
Cumene (CAS 98-82-8)	TWA	50 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Ethanol (CAS 64-17-5)	STEL	1000 ppm
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm
Gasoline (CAS 86290-81-5)	STEL	500 ppm
	TWA	300 ppm
Hexane (Other Isomers) (CAS 96-14-0)	STEL	1000 ppm
	TWA	500 ppm
n-Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (CAS 110-54-3)	TWA	50 ppm
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm
Pentane (CAS 109-66-0)	TWA	600 ppm
Toluene (CAS 108-88-3)	TWA	20 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
1,2,4, Trimethylbenzene (CAS 95-63-6)	TWA	125 mg/m3
		25 ppm
Benzene (CAS 71-43-2)	STEL	1 ppm
	TWA	0.1 ppm
Cumene (CAS 98-82-8)	TWA	245 mg/m3
		50 ppm
Cyclohexane (CAS 110-82-7)	TWA	1050 mg/m3
		300 ppm
Ethanol (CAS 64-17-5)	TWA	1900 mg/m3
		1000 ppm
Ethylbenzene (CAS 100-41-4)	STEL	545 mg/m3
		125 ppm
	TWA	435 mg/m3
		100 ppm
Hexane (Other Isomers) (CAS 96-14-0)	Ceiling	1800 mg/m3
		510 ppm
	TWA	350 mg/m3
		100 ppm
n-Heptane (CAS 142-82-5)	Ceiling	1800 mg/m3
		440 ppm
	TWA	350 mg/m3
		85 ppm
n-Hexane (CAS 110-54-3)	TWA	180 mg/m3
		50 ppm
Octane (All isomers) (CAS 111-65-9)	Ceiling	1800 mg/m3
		385 ppm
	TWA	350 mg/m3
		75 ppm
Pentane (CAS 109-66-0)	Ceiling	1800 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
		610 ppm
	TWA	350 mg/m3
		120 ppm
Toluene (CAS 108-88-3)	STEL	560 mg/m3
		150 ppm
	TWA	375 mg/m3
		100 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	655 mg/m3
		150 ppm
	TWA	435 mg/m3
		100 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Benzene (CAS 71-43-2)	25 µg/g	S-Phenylmercapturic acid	Creatinine in urine	*
Ethylbenzene (CAS 100-41-4)	0.7 g/g	Sum of mandelic acid and phenylglyoxylic acid	Creatinine in urine	*
n-Hexane (CAS 110-54-3)	0.4 mg/l	2,5-Hexanedi - on, without hydrolysis		*
	0.4 mg/l	2,5-Hexanedion, without hydrolysis	Urine	*
Toluene (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*
	0.02 mg/l	Toluene	Blood	*
Xylene (o, m, p isomers) (CAS 1330-20-7)	1.5 g/g	Methylhippuric acids	Creatinine in urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Benzene (CAS 71-43-2)	Can be absorbed through the skin.
Cumene (CAS 98-82-8)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.
Toluene (CAS 108-88-3)	Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Cumene (CAS 98-82-8)	Skin designation applies.
Toluene (CAS 108-88-3)	Skin designation applies.

US - Tennesse OELs: Skin designation

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Benzene (CAS 71-43-2)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.

US. NIOSH: Pocket Guide to Chemical Hazards

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

Appropriate engineering controls

Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.
Skin protection	
Hand protection	Avoid exposure - obtain special instructions before use. Wear protective gloves. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.
Other	Wear chemical-resistant, impervious gloves. Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.
Respiratory protection	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance	Light straw to red clear liquid with characteristic strong odor of gasoline.
Physical state	Liquid.
Form	Liquid.
Color	Light straw to red clear.
Odor	Characteristic Gasoline Odor (Strong).
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	44.01 °F (6.67 °C) May start to solidify at this temperature. This is based on data for the following ingredient: Cyclohexane. Weighted average: -91.9 deg C (-133.4 deg F)
Initial boiling point and boiling range	80.06 - 440.06 °F (26.7 - 226.7 °C)
Flash point	-40.0 °F (-40.0 °C) (closed cup)
Evaporation rate	10 - 11 BuAc
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	1.3 %
Flammability limit - upper (%)	7.1 %
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	60.8 - 101.3 kPa (20°C)
Vapor density	3 - 4 (Air=1)
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Very slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	> 500 °F (> 260 °C)
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Flash point class	Flammable IA
VOC (Weight %)	100 %

10. Stability and reactivity

Reactivity	None known.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Swallowing or vomiting of the liquid may result in aspiration into the lungs.
Inhalation	In high concentrations, mists/vapors may irritate throat and respiratory system and cause coughing. May cause drowsiness or dizziness.
Skin contact	Causes skin irritation. Prolonged contact may cause dryness of the skin.
Eye contact	May cause eye irritation.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Cyanosis (blue tissue condition, nails, lips, and/or skin). Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash.

Information on toxicological effects

Acute toxicity Based on available data, the classification criteria are not met.

Components	Species	Test Results
1,2,4, Trimethylbenzene (CAS 95-63-6)		
Acute		
Dermal		
LD50	Rabbit	> 3160 mg/kg
Inhalation		
LC50	Rat	> 2000 mg/l, 48 Hours
Oral		
LD50	Rat	6 g/kg
Benzene (CAS 71-43-2)		
Acute		
Oral		
LD50	Rat	3306 mg/kg
Cumene (CAS 98-82-8)		
Acute		
Inhalation		
LC50	Mouse	2000 mg/l, 7 Hours
	Rat	8000 mg/l, 4 Hours
Oral		
LD50	Rat	1400 mg/kg
Cyclohexane (CAS 110-82-7)		
Acute		
Oral		
LD50	Rat	12705 mg/kg

Components	Species	Test Results
Ethanol (CAS 64-17-5)		
Acute		
Inhalation		
LC50	Rat	30000 mg/m3
Ethylbenzene (CAS 100-41-4)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg
Oral		
LD50	Rat	5.46 g/kg
n-Heptane (CAS 142-82-5)		
Acute		
Inhalation		
LC50	Rat	103 mg/l, 4 Hours
n-Hexane (CAS 110-54-3)		
Acute		
Oral		
LD50	Rat	28710 mg/kg
Octane (All isomers) (CAS 111-65-9)		
Acute		
Inhalation		
LC50	Rat	118 mg/l, 4 Hours
Pentane (CAS 109-66-0)		
Acute		
Inhalation		
LC50	Rat	364 mg/l, 4 Hours
Toluene (CAS 108-88-3)		
Acute		
Dermal		
LD50	Rabbit	14.1 ml/kg
Inhalation		
LC50	Rat	8000 mg/l, 4 Hours
Oral		
LD50	Rat	2.6 g/kg
Xylene (o, m, p isomers) (CAS 1330-20-7)		
Acute		
Oral		
LD50	Rat	4300 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Based on available data, the classification criteria are not met.

Respiratory or skin sensitization

Respiratory sensitization Based on available data, the classification criteria are not met.

Skin sensitization Based on available data, the classification criteria are not met.
This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals.

Germ cell mutagenicity May cause genetic defects.
In in-vitro experiments, neither benzene, toluene nor xylene changed the number of sister-chromatid exchanges (SCEs) or the number of chromosomal aberrations in human lymphocytes. However, toluene and xylene caused a significant cell growth inhibition which was not observed with benzene in the same concentrations. In in-vivo experiments, toluene changed the number of sister-chromatid exchanges (SCEs) in human lymphocytes. Toluene may cause heritable genetic damage.

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzene (CAS 71-43-2)	1 Carcinogenic to humans.
Cumene (CAS 98-82-8)	2B Possibly carcinogenic to humans.
Ethylbenzene (CAS 100-41-4)	2B Possibly carcinogenic to humans.
Gasoline (CAS 86290-81-5)	2B Possibly carcinogenic to humans.
Toluene (CAS 108-88-3)	3 Not classifiable as to carcinogenicity to humans.
Xylene (o, m, p isomers) (CAS 1330-20-7)	3 Not classifiable as to carcinogenicity to humans.

NTP Report on Carcinogens

Benzene (CAS 71-43-2)	Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Benzene (CAS 71-43-2)	Cancer

Reproductive toxicity Suspected of damaging fertility or the unborn child.
Benzene, xylene and toluene have demonstrated animal effects of reproductive toxicity. Animal studies of benzene have shown testicular effects, alterations in reproductive cycles, chromosomal aberrations and embryo/fetotoxicity. Ethanol has demonstrated human effects of reproductive toxicity. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. Avoid exposure to women during early pregnancy. Avoid contact during pregnancy/while nursing.

Specific target organ toxicity - single exposure May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure May cause damage to the following organs through prolonged or repeated exposure: Blood. Kidneys. Liver.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects Repeated exposure of laboratory animals to high concentrations of gasoline vapors has caused kidney damage and cancer in rats and cancer in mice. Gasoline was evaluated for genetic activity in assays using microbial cells, cultured mammalian cells and rat bone marrow cells. The results were all negative so gasoline was considered nonmutagenic under these conditions. Overexposure to this product or its components has been suggested as a cause of liver abnormalities in laboratory animals and humans. Lifetime studies by the American Petroleum Institute have shown that kidney damage and kidney cancer can occur in male rats after prolonged inhalation exposures at elevated concentrations of total gasoline. Kidneys of mice and female rats were unaffected. The U.S. EPA Risk Assessment Forum has concluded that the male rat kidney tumor results are not relevant for humans. Total gasoline exposure also produced liver tumors in female mice only. The implication of these data for humans has not been determined.

Further information Symptoms may be delayed.

12. Ecological information

Ecotoxicity Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Components		Species	Test Results
1,2,4, Trimethylbenzene (CAS 95-63-6)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	7.19 - 8.28 mg/l, 96 hours
Benzene (CAS 71-43-2)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	8.76 - 15.6 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	7.2 - 11.7 mg/l, 96 hours
Cumene (CAS 98-82-8)			
Aquatic			
Crustacea	EC50	Brine shrimp (Artemia sp.)	3.55 - 11.29 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	2.7 mg/l, 96 hours
Cyclohexane (CAS 110-82-7)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	3.961 - 5.181 mg/l, 96 hours
		Striped bass (Morone saxatilis)	8.3 mg/l, 96 hours

Components		Species	Test Results
Ethanol (CAS 64-17-5)			
Aquatic			
Algae	EC50	Freshwater algae	275 mg/l, 72 Hours
		Marine water algae	1970 mg/l
Fish	LC50	Fathead minnow (Pimephales promelas)	> 100 mg/l, 96 hours
		Freshwater fish	11200 mg/l, 96 Hours
Invertebrate	EC50	Freshwater invertebrate	5012 mg/l, 48 Hours
		Marine water invertebrate	857 mg/l, 48 Hours
Ethylbenzene (CAS 100-41-4)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1 - 4 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	4 mg/l, 96 hours
n-Heptane (CAS 142-82-5)			
Aquatic			
Fish	LC50	Western mosquitofish (Gambusia affinis)	4924 mg/l, 96 hours
n-Hexane (CAS 110-54-3)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.101 - 2.981 mg/l, 96 hours
Toluene (CAS 108-88-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	5.46 - 9.83 mg/l, 48 hours
Fish	LC50	Pink salmon (Oncorhynchus gorbuscha)	6.86 - 8.48 mg/l, 96 hours
Xylene (o, m, p isomers) (CAS 1330-20-7)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	8 mg/l, 96 Hours

Persistence and degradability Not available.

Bioaccumulative potential Not available.

Partition coefficient n-octanol / water (log Kow)

Benzene (CAS 71-43-2)	2.13
Cumene (CAS 98-82-8)	3.66
Cyclohexane (CAS 110-82-7)	3.44
Ethanol (CAS 64-17-5)	-0.31
Ethylbenzene (CAS 100-41-4)	3.15
Hexane (Other Isomers) (CAS 96-14-0)	3.6
Octane (All isomers) (CAS 111-65-9)	5.18
Pentane (CAS 109-66-0)	3.39
Toluene (CAS 108-88-3)	2.73
Xylene (o, m, p isomers) (CAS 1330-20-7)	3.2
n-Heptane (CAS 142-82-5)	4.66
n-Hexane (CAS 110-54-3)	3.9

Mobility in soil Not available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

Hazardous waste code D001: Waste Flammable material with a flash point <140 °F
D018: Waste Benzene

US RCRA Hazardous Waste U List: Reference

Benzene (CAS 71-43-2)	U019
Cumene (CAS 98-82-8)	U055
Cyclohexane (CAS 110-82-7)	U056
Toluene (CAS 108-88-3)	U220
Xylene (o, m, p isomers) (CAS 1330-20-7)	U239

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated packaging Offer rinsed packaging material to local recycling facilities.

14. Transport information

DOT

UN number	UN1203
UN proper shipping name	Gasoline
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	139, B33, B101, T8
Packaging exceptions	150
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1203
UN proper shipping name	Gasoline
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	Yes
ERG Code	3H
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1203
UN proper shipping name	Gasoline
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Benzene (CAS 71-43-2)	Cancer

Central nervous system
Blood
Aspiration
Skin
Eye
Respiratory tract irritation
Flammability

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzene (CAS 71-43-2)	LISTED
Cumene (CAS 98-82-8)	LISTED
Cyclohexane (CAS 110-82-7)	LISTED
Ethanol (CAS 64-17-5)	LISTED
Ethylbenzene (CAS 100-41-4)	LISTED
Gasoline (CAS 86290-81-5)	LISTED
Hexane (Other Isomers) (CAS 96-14-0)	LISTED
n-Heptane (CAS 142-82-5)	LISTED
n-Hexane (CAS 110-54-3)	LISTED
Octane (All isomers) (CAS 111-65-9)	LISTED
Pentane (CAS 109-66-0)	LISTED
Toluene (CAS 108-88-3)	LISTED
Xylene (o, m, p isomers) (CAS 1330-20-7)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Toluene	108-88-3	0-30
Xylene (o, m, p isomers)	1330-20-7	0-25
1,2,4, Trimethylbenzene	95-63-6	0-6
Cumene	98-82-8	0-5
Ethylbenzene	100-41-4	0-5
Benzene	71-43-2	0-4.9
n-Hexane	110-54-3	0-3
Cyclohexane	110-82-7	0-3

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Ethylbenzene (CAS 100-41-4)
n-Hexane (CAS 110-54-3)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Pentane (CAS 109-66-0)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Toluene (CAS 108-88-3) 6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Toluene (CAS 108-88-3) 35 % weight/volumn

DEA Exempt Chemical Mixtures Code Number

Toluene (CAS 108-88-3) 594

US state regulations

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
Hexane (Other Isomers) (CAS 96-14-0)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. New Jersey Worker and Community Right-to-Know Act

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. Pennsylvania Worker and Community Right-to-Know Law

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
Gasoline (CAS 86290-81-5)
Hexane (Other Isomers) (CAS 96-14-0)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. Rhode Island RTK

1,2,4, Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethylbenzene (CAS 100-41-4)
n-Hexane (CAS 110-54-3)
Pentane (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Ethylbenzene (CAS 100-41-4)
Toluene (CAS 108-88-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

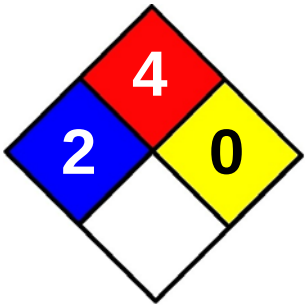
Issue date 13-May-2013

Revision date 23-May-2014

Version # 03

Further information HMIS® is a registered trade and service mark of the NPCA.

NFPA Ratings



References

ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

This material Safety Data Sheet (SDS) was prepared in accordance with 29 CFR 1910.1200 by Valero Marketing & Supply Co., ("VALERO"). VALERO does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this SDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use , the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.

APPENDIX B
ACTIVITY HAZARD ANALYSES

Project Identification 204 4th Ave.	Location Various	Estimated Dates TBD
Phase of Work Mobilization/ Demobilization	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Mobilization and demobilization of equipment site tools, personnel	Slips/trips/falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Vehicular traffic	• Spotters will be used when backing up trucks and heavy equipment and when moving equipment.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Noise	• Ear plugs or ear muffs shall be worn for operations that exceed 85 decibels.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification 204 4th Ave.	Location Various	Estimated Dates TBD
Phase of Work Excavation	**Page 1 of 2**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Excavate to required depths; soil handing and transport	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Perform air monitoring per Community Air Monitoring Plan; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; • Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.
	Heavy equipment	• Ground personnel will stay clear of suspended loads; • Ground personnel will stay out of the swing radius; • Eye contact with operators will be made before approaching equipment; • Equipment will not be approached on blind sides; • Equipment will be equipped with backup alarms or spotters shall be used.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible tripping hazards are present.

	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification 204 4th Ave.	Location Various	Estimated Dates TBD
Phase of Work Drilling	**Page 2 of 2**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. •Disposable ear plugs or other hearing protection required when working near noisy equipment..
	Steam/Heat/Splashing	• Use face shield and safety glasses or goggles; • Stay out of the splash/steam radius; • Do not direct steam at anyone; • Do not hold objects with your foot and steam area near it; • Direct spray to minimize spread of constituents of concern; and • Use shielding as necessary.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see “Electrocution” above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

Project Identification 204 4th Ave.	Location Various	Estimated Dates TBD
Phase of Work Soil/Groundwater Sampling	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Collect soil/groundwater samples.	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

Project Identification 204 4th Ave	Location Various	Estimated Dates TBD
Phase of Work Decontamination	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Decontaminate equipment	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

APPENDIX C
HEAT/COLD STRESS PROTOCOLS

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.
2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.
3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.
4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.
5. Heat exhaustion results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.

6. Treatment for heat exhaustion: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.
7. Heat stroke results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.
8. Treatment of heat stroke: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2o
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104o or above
- Coma

HEAT STRESS INDICATORS

Heat stress indicator:	When to measure:	If Exceeds:	Action:
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes) 100.6°F (after thermometer is under tongue for 3 minutes)	Shorten next work period by 33% Prohibit work in impermeable clothing
Body Weight	1. Before workday begins 2. After workday ends		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6oF or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one included below, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

FROSTBITE

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-grey to grey

1. Frostnip is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.
2. Treatment of frostnip: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.
3. Frostbite: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. DO NOT squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.
4. Treatment of frostbite: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100°F to 106°F water bath. Water temperature will drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture

or drain any blisters. NOTE: Never listen to myths and folk tales about the care of frostbite. Never rub a frostbitten or frozen area. Never rub snow on a frostbitten or frozen area. Rubbing the area may cause serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. General cooling/Hypothermia: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temp (°F)	Body Temp (°C)	Symptoms
99-96	37-35.5	Intense uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, has difficulty speaking.
90-86	32.6-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.9-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stupor. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	27.1-25.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	Below 25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. Treatment of hypothermia: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

PWGC
CLIENT DRIVEN SOLUTIONS

COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (^{0}F)P											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (^{0}F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and imersion foot may occur at any point on this chart											

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

APPENDIX D
MEDICAL DATA SHEET

MEDICAL DATA SHEET

The brief medical data sheet should be completed by on-site personnel and will be kept in the Support Zone by the HSO as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required. This form is optional, but recommended.

Project Site:			
Name:			
Age:	Height:	Weight:	Blood Type:
Employer:			
Employer Phone #:			
Emergency Contact Name:			
Emergency Contact Phone #:			
Personal Physician Name:			
Personal Physician Phone #:			
Allergies or Sensitivities:			
Previous and/or Chronic Illnesses:			
Medications:			
Medical Restrictions:			

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APPENDIX E
GENERAL HEALTH AND SAFETY WORK PRACTICES

GENERAL HEALTH AND SAFETY WORK PRACTICES

1. Site personnel must attend each day's Daily Briefing and sign the attendance sheet.
2. Any individual taking prescribed drugs shall inform the FTL/HSO of the type of medication. The FTL/HSO will review the matter with the HSM and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.
3. The personal protective equipment specified by the FTL/HSO and/or associated procedures shall be worn by site personnel. This includes hard hats and safety glasses which must be worn in active work areas.
4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.
5. Personnel must follow proper decontamination procedures and shower as soon as possible upon completion of work shift.
6. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the HSM to allow fluid intake during heat stress conditions).
7. Lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.
8. Signs and demarcations shall be followed. Such signs and demarcation shall not be removed, except as authorized by the FTL/HSO.
9. No one shall enter a permit-required confined space without a permit and appropriate training. Confined space entry permits shall be implemented as issued.
10. Personnel must follow Hot Work Permits as issued.
11. Personnel must use the Buddy System in the Exclusion Zone.
12. Personnel must follow the work-rest regimens and other practices required by the heat stress program.
13. Personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.
14. No person shall operate equipment unless trained and authorized.
15. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.

16. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.
17. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.
18. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.
19. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.
20. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out walkways and puddles unless protected and rated for the service.
21. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.
22. Horseplay of any kind is prohibited.
23. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.
24. Incidents, no matter how minor, must be reported immediately to the Supervisor.
25. Personnel shall be familiar with the Site Emergency Action Plan, which is contained in Section 12 of the HASP/EAP.

The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with regulations set forth by OSHA, the client, PWGC Supervisors, and the FTL/HSO.

APPENDIX F
HOSPITAL ROUTE MAP AND DIRECTIONS

PWGC
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pwgc.info@pwgrosser.com

HOSPITAL ROUTE
NEWYORK-PRESBYTERIAN BROOKLYN METHODIST

Hospital Contact Info: 718-780-3000

0 470 940 1,410 1,880 Feet

Site Address:
204 4th Ave,
Brooklyn, NY

Prepared For:
P.W. Grosser Consulting
630 Johnson Avenue
Bohemia, NY

Project:	AHI1903	Drawn by:	TJS
Date:	1/25/2019	Approved by:	RM
Coord. Sys:	NAD83 StatePlane NY - Long Island		

Figure No: 1

Document Path: W:\Projects\A-D\AHI\1903\mapfiles\Hospital-Route.mxd

APPENDIX G
INCIDENT REPORT FORM / INVESTIGATION FORM

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 1 OF 2
TYPE OF INCIDENT - CHECK ALL THAT APPLY
☐ INJURY/ILLNESS ☐ VEHICLE DAMAGE ☐ PROPERTY DAMAGE ☐ FIRE ☐ SPILL/RELEASE ☐ PERMIT EXCEEDENCE ☐ NEAR MISS ☐ OTHER
GENERAL INFORMATION
PROJECT NAME: DATE OF REPORT: REPORT NO.:
DATE OF INCIDENT: TIME: DAY OF WEEK:
LOCATION OF INCIDENT:
WEATHER CONDITIONS: ADEQUATE LIGHTING AT SCENE? ☐ YES ☐ NO ☐ N/A
DESCRIBE WHAT HAPPENED (STEP BY STEP - USE ADDITIONAL PAGES IF NECESSARY)
AFFECTED EMPLOYEE INFORMATION
NAME: EMPLOYEE: ☐ YES ☐ NO
HOME ADDRESS:
SOCIAL SECURITY NO.: HOME PHONE NO.:
JOB CLASSIFICATION: YEARS IN JOB CLASSIFICATION:
HOURS WORKED ON SHIFT PRIOR TO INCIDENT: AGE:
DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? ☐ YES ☐ NO
INJURY/ILLNESS INFORMATION
NATURE OF INJURY OR ILLNESS:
OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM:
FIRST AID PROVIDED? ☐ YES ☐ NO
IF YES, WHERE WAS IT GIVEN: ☐ ON-SITE ☐ OFF-SITE
IF YES, WHO PROVIDED FIRST AID:
WILL THE INJURY/ILLNESS RESULT IN: ☐ RESTRICTED DUTY ☐ LOST TIME ☐ UNKNOWN

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INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 2 OF 2 REPORT NO.
MEDICAL TREATMENT INFORMATION
WAS MEDICAL TREATMENT PROVIDED? ☐ YES ☐ NO
IF YES, WAS MEDICAL TREATMENT PROVIDED: ☐ ON-SITE ☐ DR.'S OFFICE ☐ HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT:
ADDRESS WHERE TREATMENT WAS PROVIDED:
TYPE OF TREATMENT:
VEHICLE AND PROPERTY DAMAGE INFORMATION
VEHICLE/PROPERTY DAMAGED:
DESCRIPTION OF DAMAGE:
SPILL AND AIR EMISSIONS INFORMATION:
SUBSTANCE SPILLED OR RELEASED: FROM WHERE: TO WHERE:
ESTIMATED QUANTITY/DURATION:
CERCLA HAZARDOUS SUBSTANCE? ☐ YES ☐ NO
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
PERMIT EXCEEDENCE
TYPE OF PERMIT: PERMIT #:
DATE OF EXCEEDENCE: DATE FIRST KNOWLEDGE OF EXCEEDENCE:
PERMITTED LEVEL OR CRITERIA:
EXCEEDENCE LEVEL OR CRITERIA:
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
NOTIFICATIONS
NAMES OF PERSONNEL NOTIFIED: DATE/TIME:
CLIENT NOTIFIED: DATE/TIME:
AGENCY NOTIFIED: DATE/TIME:
CONTACT NAME:
PERSONS PREPARING REPORT
EMPLOYEE'S NAME:(PRINT) SIGN:

SUPERVISOR'S NAME:(PRINT)	SIGN:

PWGC
CLIENT DRIVEN SOLUTIONS

INVESTIGATIVE REPORT			
DATE OF INCIDENT:	DATE OF REPORT:	REPORT NUMBER:	
INCIDENT COST: ESTIMATED: $_____		ACTUAL: $_____	
OSHA RECORDABLE(S): ☐ YES ☐ NO # RESTRICTED DAYS ____ # DAYS AWAY FROM WORK ____			
CAUSE ANALYSIS			
IMMEDIATE CAUSES - WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT?			
BASIC CAUSES - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT?			
ACTION PLAN			
REMEDIAL ACTIONS - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES LISTED?			
ACTION	PERSON RESPONSIBLE	TARGET DATE	COMPLETION DATE
PERSONS PERFORMING INVESTIGATION			
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
MANAGEMENT REVIEW			
PROJECT MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			
H&S MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			

EXAMPLES OF IMMEDIATE CAUSES

Substandard Actions

1. Operating equipment without authority
2. Failure to warn
3. Failure to secure
4. Operating at improper speed
5. Making safety devices inoperable
6. Removing safety devices
7. Using defective equipment
8. Failure to use PPE properly
9. Improper loading
10. Improper placement
11. Improper lifting
12. Improper position for task
13. Servicing equipment in operation
14. Under influence of alcohol/drugs
15. Horseplay

Substandard Conditions

1. Guards or barriers
2. Protective equipment
3. Tools, equipment, or materials
4. Congestion
5. Warning system
6. Fire and explosion hazards
7. Poor housekeeping
8. Noise exposure
9. Exposure to hazardous materials
10. Extreme temperature exposure
11. Illumination
12. Ventilation
13. Visibility

EXAMPLES OF BASIC CAUSES

Personal Factors

1. Capability
2. Knowledge
3. Skill
4. Stress
5. Motivation
6. Work Standards
7. Wear and tear
8. Abuse or misuse

Job Factors

1. Supervision
2. Engineering
3. Purchasing
4. Maintenance
5. Tools/equipment

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration
2. Management training
3. Planned inspections
4. Task analysis and procedures
5. Task observation
6. Emergency preparedness
7. Organizational rules
8. Accident/incident analysis
9. Personal protective equipment
10. Health control
11. Program audits
12. Engineering controls
13. Personal communications
14. Group meetings
15. General promotion
16. Hiring and placement
17. Purchasing controls

APPENDIX H
DAILY BRIEFING SIGN-IN SHEET

PWGC
CLIENT DRIVEN SOLUTIONS

DAILY BRIEFING SIGN-IN SHEET

Date: _____ Project Name/Location: _____

Person Conducting Briefing: _____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc.)

_____

_____

_____

2. OTHER ISSUES (HASP/EAP changes, attendee comments, etc.)_____

_____

_____

3. ATTENDEES (Print Name):

1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
10.	30.
11.	31.
12.	32.
13.	33.
14.	34.
15.	35.
16.	36.
17.	37.
18.	38.
19.	39.
20.	40.

APPENDIX H
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**

APPENDIX I

O&M MANUAL FOR SSDS and AS-BUILTS

204 4TH AVENUE
BROOKLYN, NEW YORK 11217
BLOCK 434, LOT 35
FORMER SPEEDWAY STATION

VAPOR MITIGATION SYSTEM OPERATION, MAINTENANCE, AND MONITORING PLAN

PREPARED FOR:

204 4th Avenue, LLC.
51 East 12th Street, 7th Floor
New York, New York 10003

PREPARED BY:

P.W. Grosser Consulting Engineer & Hydrogeologist, PC.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353

PWGC Project Number: AHI2005

NOVEMBER 2023

OPERATION, MAINTENANCE, AND MONITORING PLAN
204 4TH AVENUE,
BROOKLYN, NEW YORK 11217

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2.0 OM&M OF COMPOSITE COVER SYSTEM 4

3.0 OM&M OF SSDS 4

3.1 SSDS Start-up Plan 4

3.1.1 SSDS Start-up Plan Steps 4

3.2 System Components 5

3.3 Routine System OM&M 5

3.4 Non-Routine System OM&M 6

APPENDICES

Appendix O-A	Site Cover Inspection Form
Appendix O-B	Manufacturer Specifications
Appendix O-C	SSDS OM&M Log

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ACRONYM	DEFINITION
AMEC	AMEC E&E LP
AWQS	Ambient Water Quality Standard
DO	Dissolved Oxygen
O&M	Operation & Maintenance
OM&M	Operation, Maintenance, & Monitoring
ORP	Oxygen Reduction Potential
PE	Professional Engineer
SSDS	Sub-Slab Depressurization System
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
W.C.	Water Column

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1.0 INTRODUCTION

This Operation, Maintenance, and Monitoring (OM&M) Plan provides a description of the measures necessary to operate, monitor, and maintain the vapor intrusion mitigation system for the site.

As part of construction, several protective systems were installed. These include:

1. Composite Cover System
2. Vapor Barrier System
3. Sub-Slab Depressurization System (SSDS)

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2.0 OM&M OF COMPOSITE COVER SYSTEM

This composite cover system is comprised of an impermeable surface across the entire site in the form of a building slab measuring approximately 12 inches in thickness and subgrade foundation walls measuring approximately 8 inches in thickness.

The system will be inspected annually, and its performance certified by a professional engineer (PE). The composite cover system does not require any special operation and maintenance (O&M) activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the system according to the original design and tying newly constructed cover layers into existing cover layers to form a continuous layer.

If the composite cover system and underlying residual soil/material must be disturbed, the protocols outlined in the PWGC November 2023 Site Management Plan that OM&M Plan is attached to. An annual site cover inspection checklist is attached as **Appendix O-A**

3.0 OM&M OF SSDS

A SSDS will be activated beneath the slab-on-grade foundations of the new building. Sub-slab depressurization is a mitigation technology that creates a negative pressure gradient between the occupied space and the sub-slab allowing for vapors to be drawn through piping and/or a breathable membrane and exhausted to the atmosphere. This mitigates against potential volatile chemicals from moving from the sub-surface into the indoor air of the overlying building.

3.1 SSDS Start-up Plan

Start-up and testing of the SSDS shall be conducted to ensure the system operates effectively for mitigation. System vacuum will be balanced for efficient removal of vapors and vacuum below the building slab. Review of system components post start-up will be conducted including but not limited to;

- Inspection of piping, fittings, & equipment to ensure there are no leaks;
- Measuring of vacuum below the building's slab at designated vacuum monitoring points;
- Collection of indoor air samples;
- Review of equipment to ensure it is operating according to manufacturer's specifications; and
- System alarms are functional.

If for any reason the system is not operating per design, the system will be troubleshot, and deficient items will be corrected.

3.1.1 SSDS Start-up Plan Steps

The following Low Vacuum Alarm Testing is required:

- Follow all installation instructions as indicated by the manufacturer
- Disconnect pressure tubing from the riser pipe
    - Alarm should trigger on the building management system
- Connect pressure tubing to the riser pipe

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  - Alarm should reset on the building management system
- Reconnect tubing, test complete

3.2 System Components

The SSDS system is comprised of the following components within the occupied spaces of the landmark building, if activated:

- Riser Piping – Risers penetrate the concrete building foundation at the connection to the TerraVent and continue vertically through the building to the Fantech® Rn4EC fans on the roof.
- Fantech® Rn4EC – A Fantech® Rn4EC fan is installed on the terminus of each riser on the roof with the exhaust a minimum of 10-feet from fresh air intakes. Vacuum should be within normal operating range, with a minimum vacuum of 0.004" of water column (W.C.).
- Vacuum Gauges – Installed on the riser piping on the first floor of the building, upstream of the Fantech® Rn4EC fans .
- Low Vacuum Alarms – The system is equipped with low vacuum alarms which are connected to the building management system which are triggered when the system's vacuum drops below the normal operating range. Alarms are installed on each riser pipe.
- Vapor Monitoring Points – Monitoring points are installed within the slab to measure and monitor the system's vacuum.

The SSDS will be equipped with a telemetry system once activated to alert the engineer of the system remotely of performance issues. Manufacturer specifications for the mechanical components of the systems are included in **Appendix O-B**.

3.3 Routine System OM&M

Routine OM&M of the SSDS system, including vapor monitoring points, should be performed on a quarterly basis for the first year of operation and then annually thereafter and will include assessing the system's current condition.

A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The inspection should include review of system components including piping, concrete slab integrity, radon fans, low vacuum alarms, and vapor monitoring points to ensure components are functioning effectively. If leaks are observed, they should be immediately repaired. Additionally, the location of the exhaust vent should be observed to ensure no air intakes have been located within a 10' radius.

The system's performance should be monitored to ensure a proper minimum vacuum is observed at monitoring points. Each vacuum monitoring point shall be tested for a minimum vacuum of 0.004" water column (W.C.). If vacuum does not meet the minimum requirement of 0.004" W.C., the system should be adjusted to meet the condition. Vacuum readings should be recorded on

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the OM&M Logs (**Appendix O-C**) for each event. If any readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair is required immediately.

3.4 Non-Routine System OM&M

In the event that non-routine maintenance is needed, the following information will be recorded and included in the subsequent status report:

- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Damage;
- Level and duration of reduced effectiveness;
- Other repairs or adjustments made to the system
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents; and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc.

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APPENDIX O-A
SITE COVER INSPECTION FORM

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Annual Inspection Checklist – Site Cover System

FORMER SPEEDWAY STATION

204 4th Avenue

Brooklyn, New York

NYSDEC BCP #224295

Date/time: _____

Inspector (name/organization):

Detail the condition of the Site Cover System including the first-floor concrete slab, basement concrete slab, and basement foundation walls. Make note of any significant penetrations through the concrete slab:

Detail the condition of the monitoring wells (MW-1 through MW-6) and note observed damage such as broken covers, damaged casing, and biofouling:

Are any repairs and/or maintenance needed at this time? If so, conduct another inspection following repairs.

Name	Signature	Date

APPENDIX O-B
MANUFACTURER'S SPECIFICATIONS

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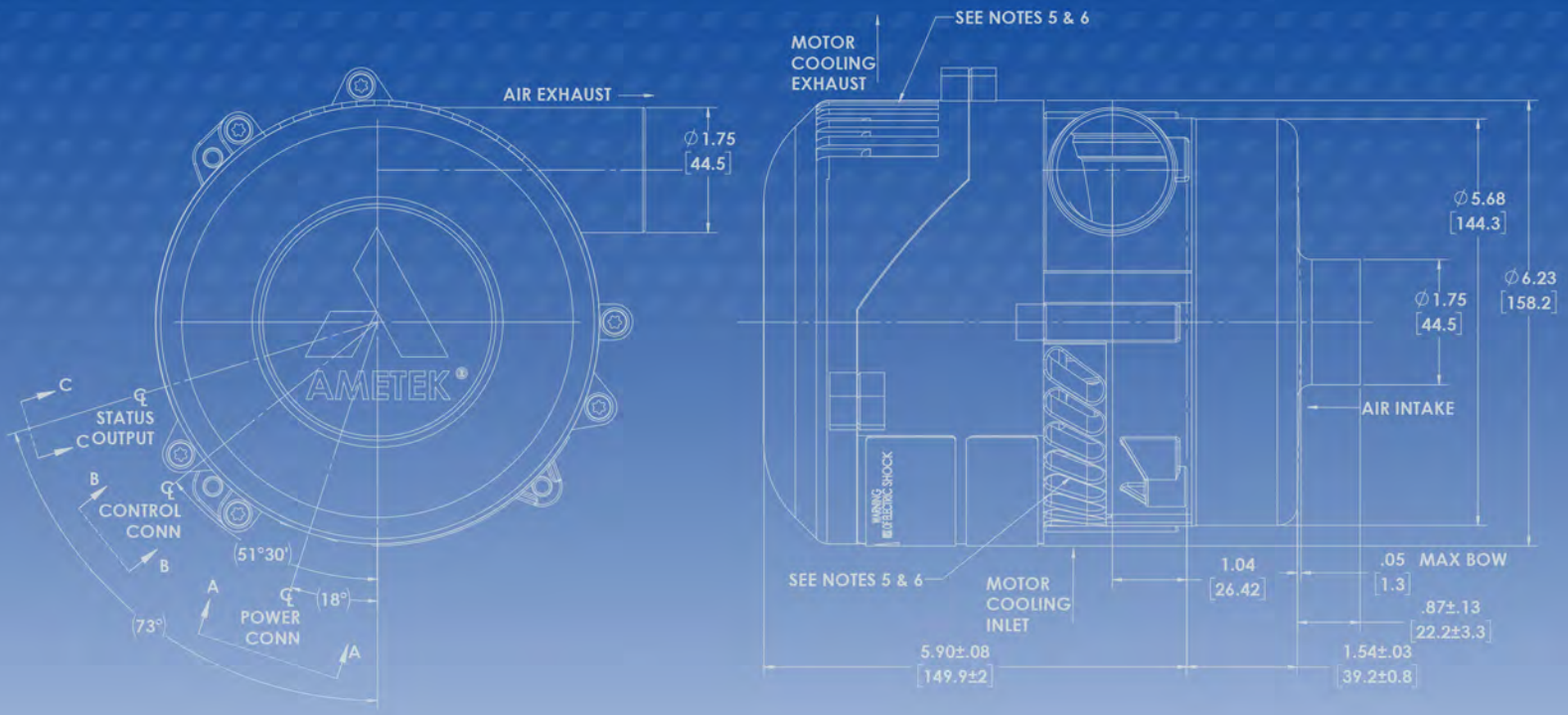
AMETEK®
DYNAMIC FLUID SOLUTIONS



Windjammer® PRO

Selection Guide

- Greater efficiency and flow
- More robust design
- Common performance – 120 to 240 VAC
- Most configurable blower on the market
- Runs cooler, cleaner and longer
- Improved software flexibility

Windjammer® PRO

Key Features

- Higher performance design with “Common Performance” model provides 17% greater flow compared to other manufacturers
- “Common Performance” provides the same air performance between 120 VAC and 240 VAC
- New design reduces overall noise and improves sound quality
- Innovative cooling chamber provides lower operating temperature prolonging overall life
- Improved flexibility for speed control, data logging, and programmability

We Keep the World Moving . . .

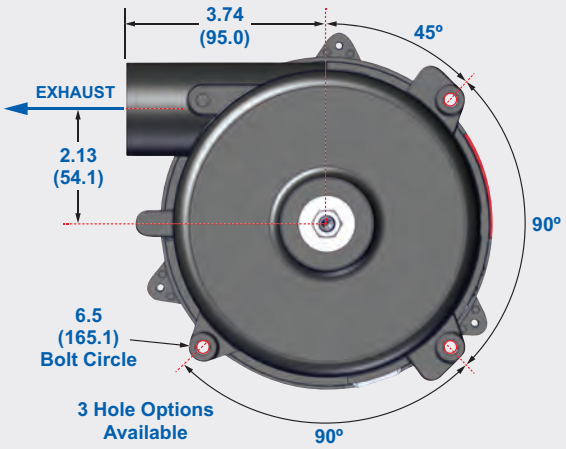
The innovative design and enhancements of the Windjammer® PRO provide **INCREASED PERFORMANCE** over competitive models. One key feature is the ability to apply multiple performance profiles depending on the application requirement. New to the feature list, “Common Performance” provides the ability to have the same air performance whether operating at 120 or 240 VAC. This is great for OEM products designed for the global market.

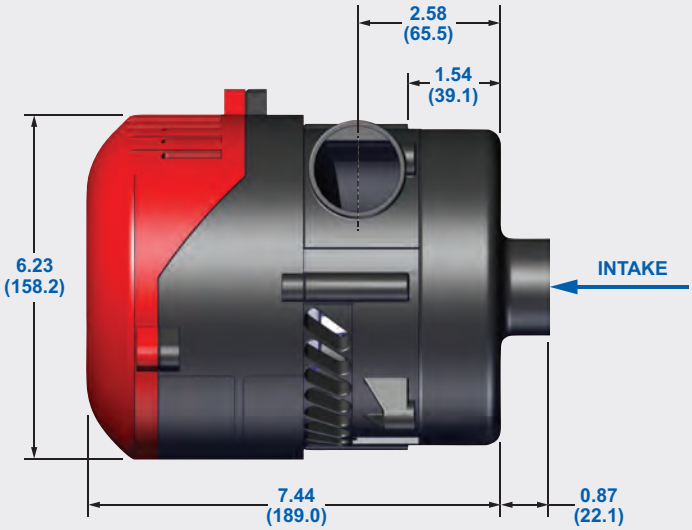
The Windjammer® PRO operates at a **LOWER TEMPERATURE** to extend the life of the brushless motor. Improved motor cooling along with shaft and bearing assembly redesigns extend the life of bearings and sensitive electronic modules.

The redesigned blower housing and optional motor cooling ducts makes this model perfect for **HUMID AND HARSH ENVIRONMENTS**. Improved sealing along with a reconfigured bearing prevents contamination from infiltrating into the bearings or motor controller assembly, prolonging the blowers’ life in these environments.

Principles of our Acustek® technology have been applied to **REDUCE NOISE** and substantially improve the sound quality produced by this blower. A redesigned motor enclosure with improved air and noise channeling makes the Windjammer® PRO one of AMETEK’s quietest high flow designs available.

Next generation controller software adds **IMPROVED FLEXIBILITY** over other designs. Custom speed and acceleration profiles, overcurrent safety limits, and error logging are just a few of the new software features available with the Windjammer® PRO.





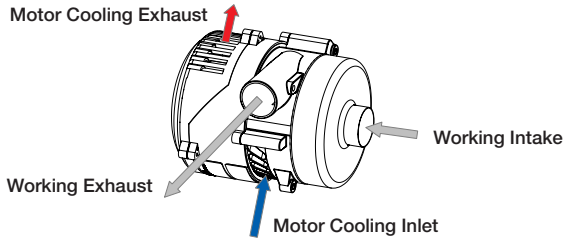
AMETEK®
DYNAMIC FLUID SOLUTIONS

Configuring Your Blower

Please examine and check off the following steps to help you determine your requirements at a glance. Contact your local AMETEK sales representative for a list of standard configurations. Other variations may require additional lead time.

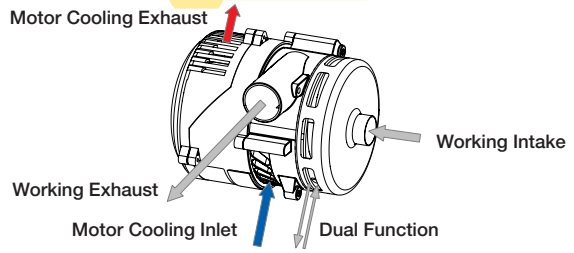
Step 1 Construction

☐ **Bypass**



Working air is separated from the motor cooling air. This is great for environments with contamination, high heat, moisture, etc.

☐ **Dual Function**



A dual function bypass blower has additional slotted holes that enable it to function in vacuum or pressure.

Condition 1: Block Working Intake → Vacuum Function

Condition 2: Block Working Exhaust → Pressure Function

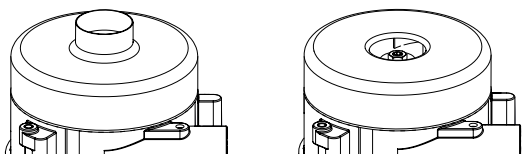
Condition 3: Block Working Intake/Exhaust → Pressure Function

Step 2 Input Voltage

☐ 120 AC	☐ 240 AC	☐ Dual Voltage
110-132 VAC 50/60 Hz	**208-264 VAC 50/60 Hz** 240V models are optimized and typically offer higher air performance than dual voltage models	**120-132 VAC 50/60 Hz I 18A** **208-264 VAC 50/60 Hz I 13A** Dual Voltage offers the same air performance when supplied 120 or 240 VAC

Step 3 Working Inlet Style

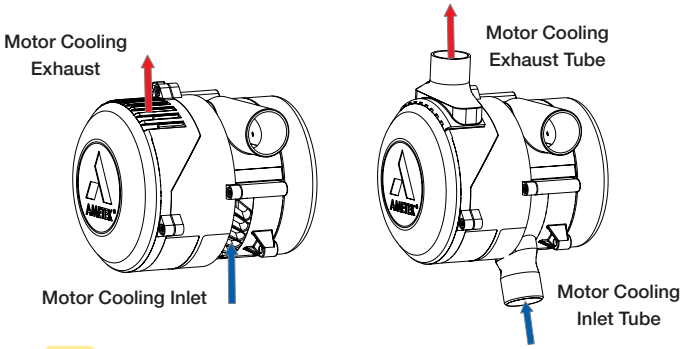
☐ **Intake Tube** ☐ **Bell Mouth**



If intake tube is not being used in system, a bell mouth configuration will provide more air flow performance.

Step 4 Motor Cooling Style

☐ **Dual Vents** ☐ **Dual Tubes**



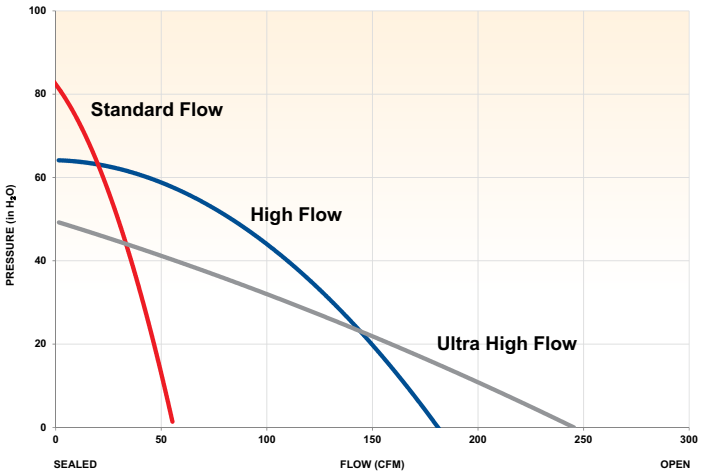
☐ **Intake Tube Only** ☐ **Discharge Tube Only**

These options allow for **warm** motor exhaust air to be ducted outside, or **clean/dry** motor cooling air to be ducted inside.

Step 5 Flow Performance

☐ Standard	☐ High	☐ Ultra High
1.25" (31.8) Intake	**1.75" (44.5) Intake**	**2.75" (69.9) Intake**
1.25" (31.8) Discharge	**1.75" (44.5) Discharge**	**2.50" (63.5) Discharge**

Generally, more flow on the "open" side of the curve reduces the maximum pressure on the "sealed" side of the curve. A lot of other factors (voltage, construction, stages, etc.) affect these curves so this chart should be used for reference only. Always refer to individual data sheet for actual performance data.

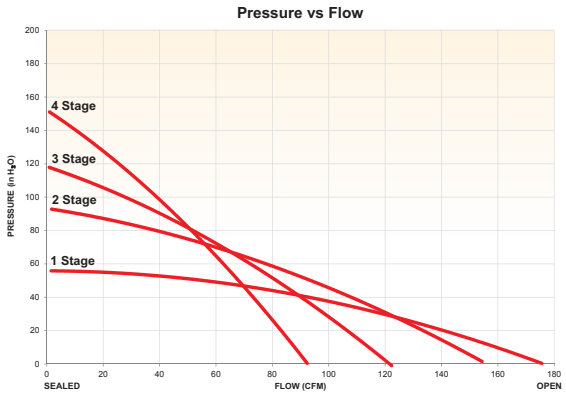


Step 6 Pressure Performance

☐ 1 Stage ☐ 2 Stage

☐ 3 Stage ☐ 4 Stage

Generally, more pressure on the “sealed” side of the curve reduces the maximum flow on the “open” side of the curve. Always refer to individual datasheet for actual performance data. When operating on the left side of the chart (low flow) an increase in the number of stages can give you substantially more pressure.

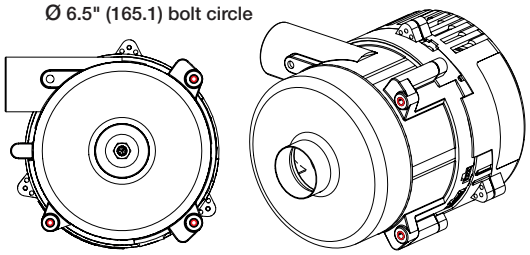


Step 7 Mounting

☐ 5/16" Through Holes

☐ 1/4-20 ☐ M6 x 1

3 holes spaced 90° apart on a
Ø 6.5" (165.1) bolt circle



Step 8 Protection

☐ Standard

☐ Silicone Coating

Silicone coated board protects the motor controller from environments with high amounts of debris.

☐ Silicone Coating + SST Hardware

Steel components (including shaft and bearings) are replaced with SST to provide additional corrosion resistance.

Step 9 Speed Command

PWM

75% PWM
50% PWM
25% PWM

15 – 45 vdc max amplitude 30 Hz – 20 kHz frequency range

Speed command options allow the blower speed to be controlled via a configurable input signal. If the 0-10 vdc option is selected an input signal of 5 vdc is sent to the blower it will result in a half speed command.

☐ 0-10 vdc

Configurable from 0-15 vdc

☐ Mechanical

Onboard Potentiometer

☐ Remote Potentiometer

Provides a 5 vdc output which can be connected to a remote mounted (customer supplied) potentiometer.

☐ 4-20 mA ☐ PWM

Typically 4-20 mA and PWM commands offer better isolation from other system signals (noise).

ALSO SELECT: *(Only applicable for 0-10, 4-20 and PWM options)*

☐ Pull Up

If speed command is lost, blower will operate at full speed.

☐ Pull Down

If speed command is lost, blower speed will be reduced to zero.

Step 10 Speed Control

☐ Open Loop

Open loop control refers to the blower response when sent a speed command. An open loop blower speed is permitted to shift as the load (pressure/vacuum) that the blower is working against changes. Eg: if the pressure goes up the speed will go up.

☐ Closed Loop

Closed loop control refers to the blower response when sent a speed command. A closed loop blower remains at constant speed as the load (pressure/vacuum) that the blower is working against changes. Eg: if the blower operating at 12,000 RPM is sent a 50% speed command, the blower will operate at half speed (6,000 RPM). When the pressure increases, the blower will again be regulated to 6,000 RPM.

Step 11 Wiring Harness *(Check all required)*

☐ No Harness *(Customer must supply connectors)*

Power | AMP 350766-1 Connector, TE 640310-3 Sockets
Speed | MOLEX 39-01-4051 Connector, 39-00-0208 Sockets
Status | MOLEX 50-29-1662 Connector, 39-00-0214 Sockets

☐ Power Input Harness

Provided with flying leads

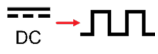
☐ Speed Input/Output Harness

Speed output can be configured to 1,2,3, or 6 pulses per revolution (standard 2 pules per revolution)

☐ Status Output Harness

Status out “pulse codes” are outlined in the operation manual

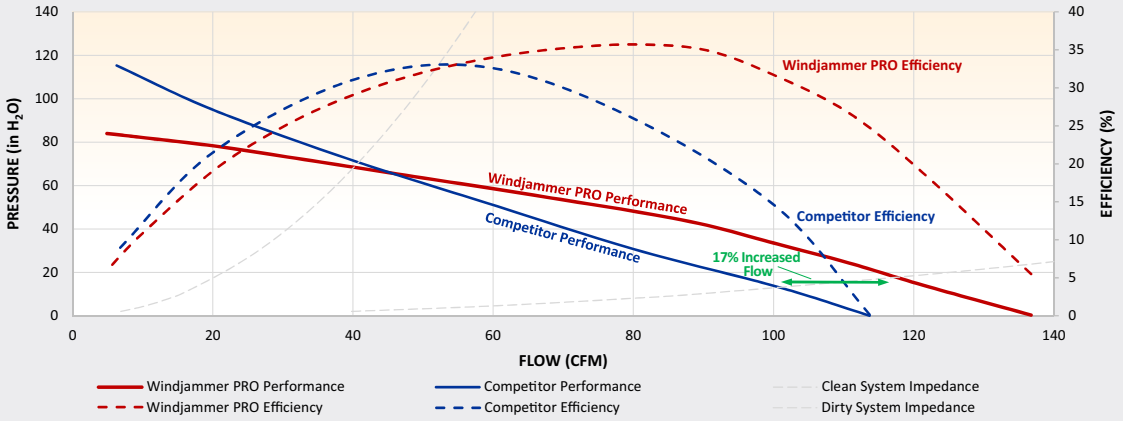
Both Speed and Status connectors supply a 15 vdc amplitude pulsed (digital) signal. It is also possible to supply an outside voltage (up to 15 vdc).



LEAD LENGTH: *(Not applicable for “No Harness” option)*

☐ 6.5" (165mm) ☐ 15" (380mm) ☐ 24" (610mm)

Performance and Efficiency Data



Notes: Data presented represents blower performance at STANDARD AIR DENSITY, .075 lb/ft³ (29.92" Hg, Sea Level, 68°F). Vacuum performance available upon request.

Technical Data

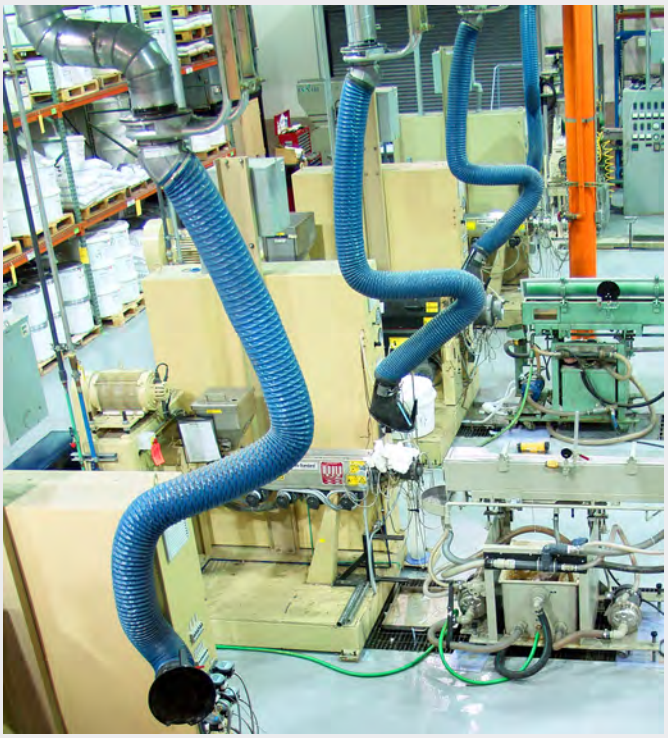
Sound Level @ Full Speed: 82dB (A) and 55 Sones

Operating Temperature (Working Air): -4°F to 122°F (-20°C to 50°C)

Approximate Weight: 6.5 Lbs (2.95 Kg)

Standard Options

The proven reliability of the AMETEK Windjammer® makes the PRO Series the perfect fit for an extraordinary number of applications around the world. AMETEK has learned numerous lessons from past engagements fueling the Windjammer® Pro's development, design, and value creation. The features and functions offered allow the Windjammer® PRO to fit more seamlessly into any application. See standard configurations.



Custom Options

AMETEK is committed to making your life easier. If you do not find the options you desire above, we also offer customized services. Contact your sales representative for more information.

Windjammer PRO Ordering Information

Size

057 = 5.7

Construction

B = Bypass T = Thru-flow P = Peripheral S = Slotted shell (dual purpose)

Inlet/Outlet Size

S = Standard Flow H = High flow U = Ultra high flow

Fan System

1 = Single stage 2 = 2 Stage 3 = 3 Stage 4 = 4 Stage X = Non standard

Voltage

0 = Dual voltage 120/240 1 = 110/120 2 = 230/240

Performance Level

F = Good N = Better (standard) H = Best

Mounting Holes

A = (3X) 5/16" thru (standard) B = (3x) 1/4-20 C = (3X) M6

Working Air Intake, Motor Cooling Intake – Discharge

A = Bell-mouth, intake slots – discharge slots
B = Inlet tube, intake slots – discharge slots
C = Bell-mouth, intake tube – discharge slots
D = Inlet tube, intake tube – discharge slots

Protection

0 = Conformal coated PCBA (standard)
1 = Add silicone coating on PCBA
2 = Add silicone coating on PCBA with stainless steel components

Feedback Loop

0 = Open loop 1 = Closed loop

Speed Control

0 = Mechanical
1 = Remote potentiometer
2 = 0-10V pull down
3 = 0-10V pull up
4 = 4-20mA pull down
5 = 4-20mA pull up
6 = PWM pull down
7 = PWM pull up

Wiring Harnesses (flying leads)

A = No harnesses
B = 6.5" power, speed and status out
C = 6.5" power only
D = 15" power, speed and status out
E = 15" power only
F = 24" power, speed and status out
G = 24" power only

Packaging

B = Bulk pack
S = Single pack

WP	057	B	H	2	-	0	N	TBD	A	-	TBD	/	A	A	0	1	3	-	A	S

Example: WP057BH2-0N##A-#### / AA013-AS

AMETEK®
DYNAMIC FLUID SOLUTIONS

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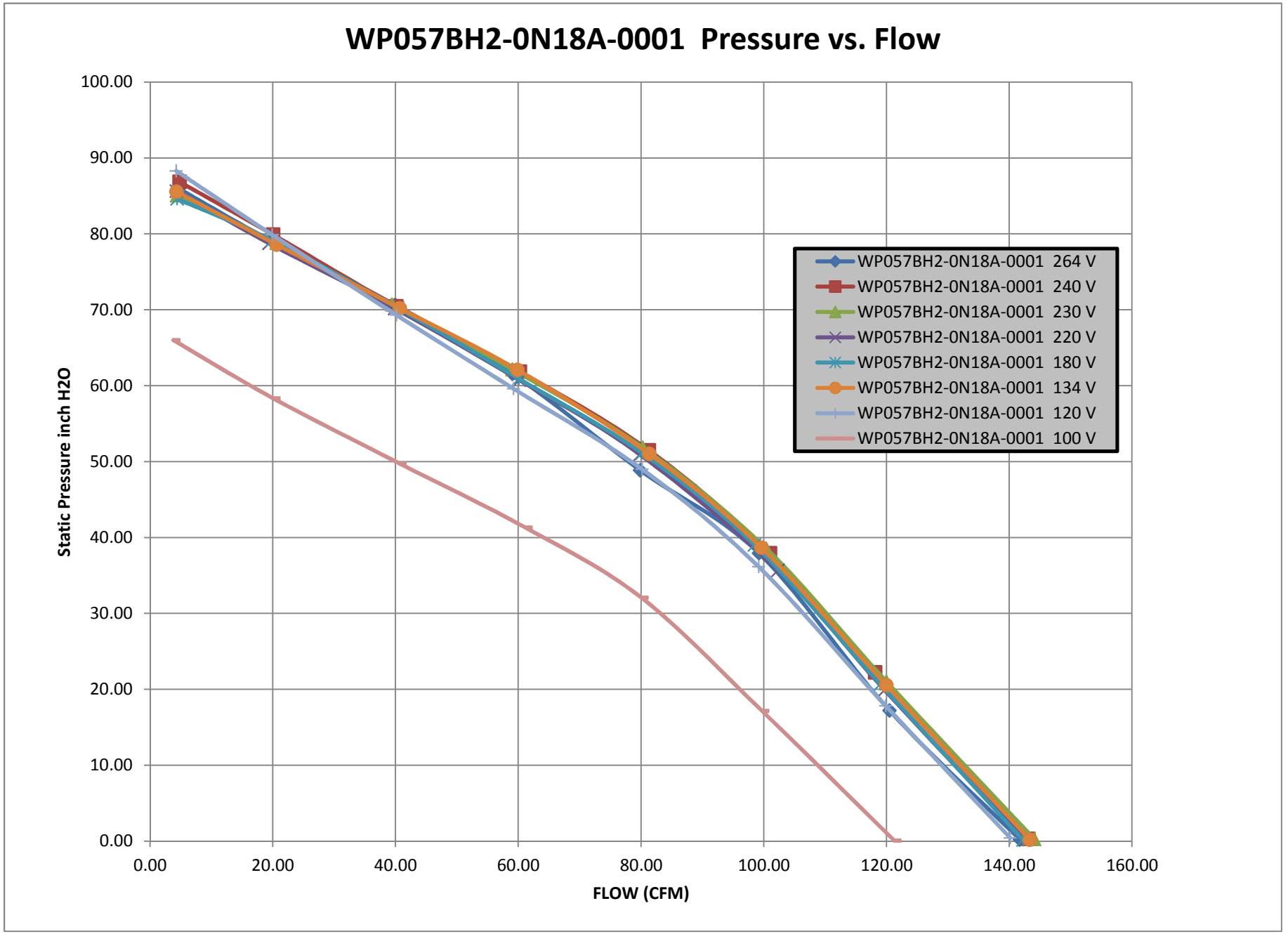

WP057BH2-0N18A-0001 Pressure vs. Flow
Static Pressure inch H2O
FLOW (CFM)
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
WP057BH2-0N18A-0001 264 V
WP057BH2-0N18A-0001 240 V
WP057BH2-0N18A-0001 230 V
WP057BH2-0N18A-0001 220 V
WP057BH2-0N18A-0001 180 V
WP057BH2-0N18A-0001 134 V
WP057BH2-0N18A-0001 120 V
WP057BH2-0N18A-0001 100 V

AMETEK, Dynamic Fluid Solutions

Blower Test Report

Test administered by: LOUGHNEY **REA** **Serial #**

Model under test: WP057BH2-0N18A-0001 **Lab Log #** **Date:** 2/20/2018

Time: 11:43:13

Ambient Temperature	25.0 °C	**Humidity Ratio**	0.0116
Barometric Pressure	28.96 inch Hg	**Air Density**	0.0711 lb/ft^3
Relative Humidity	56.3 %	**Correction Factor**	1.055
		Pipe ID	4.00 inch

Remarks:

Flow Rate *cfm*	Static Pressure *inch H2O*	Total Pressure *inch H2O*	Current *A*	Power Demand *W*	Voltage *V*	Flow Temperature *°C*	Rotational Speed *rpm*	Static Efficiency %	Total Efficiency %
141.72	0.22	0.38	11.65	1464.10	264.08	31.84	17880	0.26	0.45
120.50	17.22	17.34	11.63	1460.72	264.08	31.50	17580	17.15	17.27
99.21	37.93	38.02	11.06	1384.96	264.10	31.63	16980	27.96	28.03
79.87	48.86	48.91	11.58	1457.03	264.09	32.34	17550	32.39	32.42
59.06	61.55	61.58	11.33	1424.85	264.10	32.98	18360	30.90	30.92
39.94	70.64	70.65	10.37	1300.65	264.14	33.97	18960	26.34	26.34
20.02	78.93	78.93	9.16	1138.89	264.40	34.27	19620	16.86	16.87
4.68	85.98	85.98	8.07	990.52	264.24	33.08	20340	4.93	4.93
143.12	0.30	0.46	13.26	1501.24	240.06	31.18	18120	0.34	0.53
118.14	22.25	22.36	13.55	1529.74	240.05	31.35	17970	20.73	20.84
101.00	37.93	38.02	13.70	1544.61	240.04	31.68	17880	29.95	30.01
81.28	51.49	51.55	13.54	1528.47	240.06	32.18	17970	33.10	33.14
60.26	61.84	61.87	12.56	1434.45	240.08	32.86	18420	31.46	31.48
40.11	70.48	70.49	10.99	1280.92	240.13	34.01	18960	26.80	26.81
20.05	79.90	79.90	9.73	1127.60	240.19	34.56	19770	17.27	17.27
4.81	86.85	86.85	8.66	991.37	240.24	33.07	20520	5.11	5.11
144.07	0.27	0.44	13.92	1492.99	230.28	31.87	18120	0.32	0.52
119.99	21.02	21.14	14.12	1521.39	230.26	31.66	17970	20.02	20.13
100.43	38.52	38.60	14.39	1537.96	230.26	31.88	17880	30.39	30.45
80.28	51.85	51.90	14.12	1518.26	230.27	32.34	17970	33.16	33.19
59.07	62.14	62.17	13.60	1411.90	230.23	33.14	18450	31.50	31.52
39.44	70.71	70.72	12.14	1268.80	230.27	34.15	18990	26.70	26.71
20.64	78.80	78.81	10.24	1111.96	230.31	34.45	19680	17.79	17.79
4.38	85.07	85.07	8.87	952.14	230.37	32.78	20340	4.74	4.74
142.58	0.20	0.37	14.62	1448.26	220.21	30.91	17970	0.24	0.44

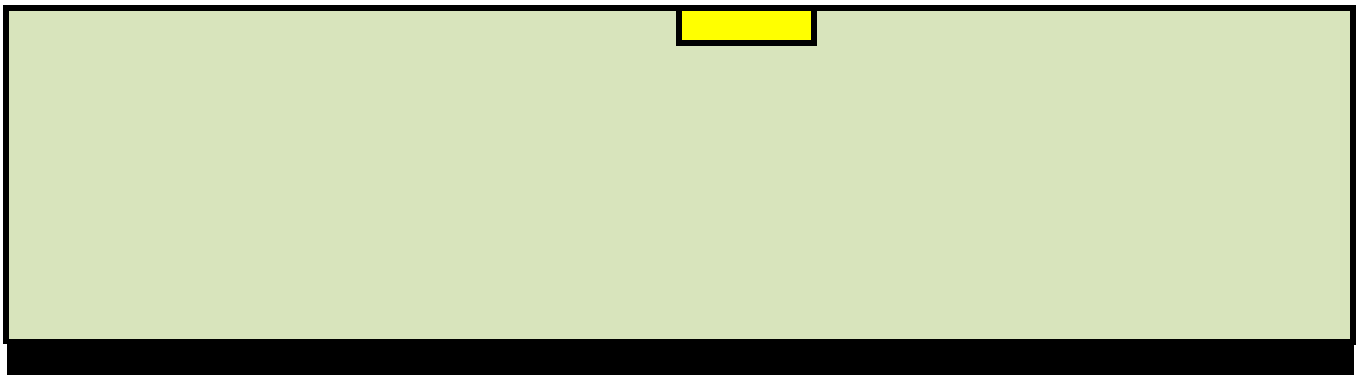
119.70	19.91	20.02	14.79	1473.23	220.20	30.92	17850	19.49	19.60
102.33	35.69	35.78	14.88	1487.20	220.19	31.19	17790	29.62	29.69
79.82	50.94	50.99	14.77	1470.34	220.19	31.81	17850	33.40	33.43
60.19	60.74	60.77	14.18	1389.96	220.22	32.51	18300	31.82	31.83
39.88	70.16	70.17	12.77	1257.09	220.26	33.54	18930	27.00	27.00
19.41	78.76	78.76	10.38	1086.64	220.31	34.03	19680	17.08	17.08
4.33	85.63	85.63	9.18	954.37	220.36	32.16	20460	4.69	4.69

142.25	0.17	0.34	15.94	1391.86	180.22	29.68	18000	0.21	0.41
119.00	20.68	20.80	16.04	1415.05	180.20	30.00	17880	20.91	21.03
98.49	39.03	39.11	16.13	1436.11	180.28	30.39	17790	32.22	32.28
80.20	51.11	51.17	16.04	1417.70	180.28	31.04	17880	34.86	34.89
60.13	60.91	60.94	15.66	1335.31	180.23	31.81	18330	33.12	33.14
40.33	70.26	70.28	15.16	1223.86	180.28	32.99	18960	28.05	28.05
19.92	79.14	79.14	14.03	1073.58	180.36	33.44	19710	17.81	17.81
4.43	84.60	84.60	10.45	905.47	180.40	32.09	20250	5.00	5.00

143.36	0.18	0.35	18.10	1431.35	133.85	29.25	18120	0.22	0.42
119.99	20.55	20.66	18.28	1455.07	133.80	29.57	17970	20.35	20.46
99.61	38.67	38.75	18.42	1470.31	133.79	30.02	17850	31.50	31.57
81.34	51.03	51.08	18.29	1455.40	133.80	30.63	17970	34.34	34.38
59.85	62.10	62.13	17.55	1369.61	133.85	31.41	18480	32.74	32.76
40.70	70.20	70.21	16.24	1216.07	133.94	32.51	18990	28.42	28.43
20.62	78.59	78.59	14.66	1040.51	134.04	32.94	19680	18.86	18.86
4.33	85.56	85.56	12.69	883.89	134.13	31.21	20400	5.05	5.05

140.16	0.43	0.59	18.20	1355.86	120.12	27.37	17760	0.53	0.73
119.87	17.83	17.95	18.45	1375.29	120.13	27.65	17640	18.57	18.69
99.18	36.15	36.23	18.61	1391.18	120.12	28.28	17550	30.85	30.92
80.18	48.99	49.04	18.48	1377.35	120.13	28.77	17610	34.18	34.21
59.23	59.61	59.64	17.73	1298.53	120.17	29.56	18150	32.65	32.67
40.15	69.31	69.32	16.68	1190.92	120.25	30.75	18840	28.14	28.15
19.90	79.89	79.90	15.29	1049.75	120.33	31.13	19800	18.26	18.26
4.29	88.29	88.29	13.93	919.88	120.41	29.44	20700	4.95	4.95

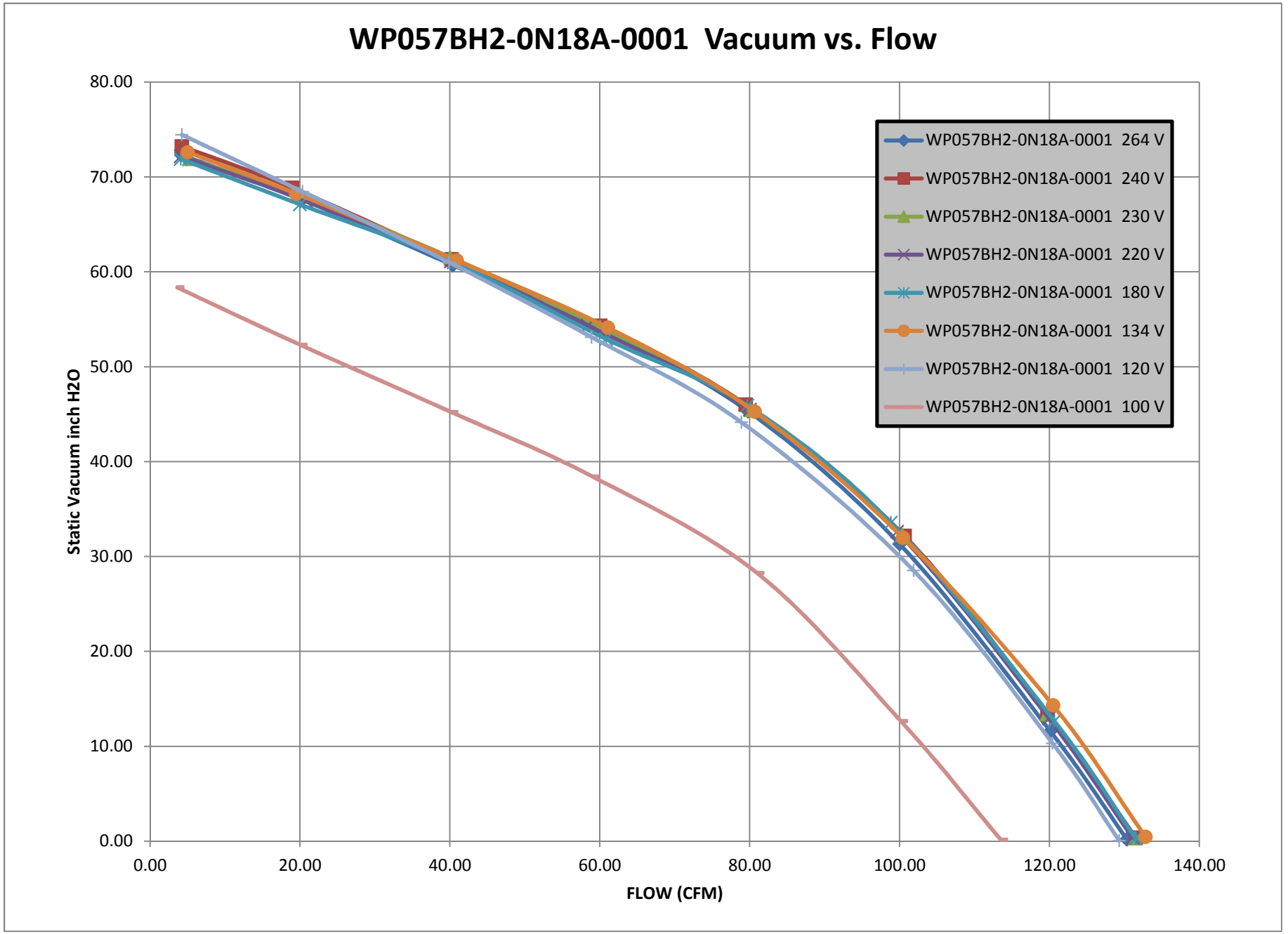
121.28	0.07	0.19	14.58	891.82	100.07	24.78	15540	0.11	0.30
99.74	17.14	17.22	14.88	909.78	100.07	25.27	15450	22.32	22.42
80.07	32.08	32.13	15.02	918.76	100.05	25.76	15390	33.24	33.30
61.18	41.31	41.34	14.48	880.96	100.07	26.48	15630	34.18	34.21
40.64	49.76	49.77	13.33	799.10	100.13	26.96	16200	30.19	30.20
20.10	58.32	58.33	12.06	695.29	100.21	27.52	17040	20.15	20.15
3.81	66.01	66.01	10.83	600.49	100.29	26.24	17850	4.99	4.99



PRESSURE SHEET

Auto Populated don't change

Voltages Tested To			
WP057BH2-0N18A-0001	264	V	
WP057BH2-0N18A-0001	240	V	
WP057BH2-0N18A-0001	230	V	
WP057BH2-0N18A-0001	220	V	
WP057BH2-0N18A-0001	180	V	
WP057BH2-0N18A-0001	134	V	
WP057BH2-0N18A-0001	120	V	
WP057BH2-0N18A-0001	100	V	
WP057BH2-0N18A-0001	0	V	
WP057BH2-0N18A-0001	Pressure	vs.	Flow


WP057BH2-0N18A-0001 Vacuum vs. Flow
Static Vacuum inch H2O
FLOW (CFM)
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
WP057BH2-0N18A-0001 264 V
WP057BH2-0N18A-0001 240 V
WP057BH2-0N18A-0001 230 V
WP057BH2-0N18A-0001 220 V
WP057BH2-0N18A-0001 180 V
WP057BH2-0N18A-0001 134 V
WP057BH2-0N18A-0001 120 V
WP057BH2-0N18A-0001 100 V

AMETEK, Dynamic Fluid Solutions

Blower Test Report

Test administered by: LOUGHNEY **REA** **Serial #**

Model under test: WP057BH2-0N18A-0001 **Lab Log #** **Date:** 2/20/2018

Time: 11:43:13

Ambient Temperature	25.0 °C	**Humidity Ratio**	0.0116
Barometric Pressure	28.96 inch Hg	**Air Density**	0.0711 lb/ft^3
Relative Humidity	56.3 %	**Correction Factor**	1.055
		Pipe ID	4.00 inch

Remarks:

Flow Rate *cfm*	Static Vacuum *inch H2O*	Total Vacuum *inch H2O*	Current *A*	Power Demand *W*	Voltage *V*	Flow Temperature *°C*	Rotational Speed *rpm*	Static Efficiency *%*	Total Efficiency *%*
130.31	0.20	2.82	11.76	1483.54	264.20	21.74	17910	0.21	2.92
120.12	11.58	13.80	11.76	1486.92	264.34	21.64	17910	11.01	13.12
100.02	31.31	32.85	11.67	1465.63	263.99	21.61	17970	25.15	26.39
79.76	45.32	46.30	11.57	1457.30	264.14	21.61	18210	29.19	29.82
60.77	53.58	54.15	10.90	1370.26	264.09	21.57	18660	27.96	28.26
40.42	60.70	60.95	9.80	1221.04	264.14	21.55	19200	23.64	23.74
20.24	67.61	67.67	8.65	1064.66	264.13	21.51	19980	15.12	15.13
4.21	72.31	72.32	7.49	910.70	264.18	21.47	20580	3.93	3.93
131.52	0.37	3.03	13.20	1491.55	240.07	21.63	18090	0.38	3.14
119.73	13.37	15.58	13.18	1490.08	240.07	21.55	18090	12.64	14.73
100.66	32.17	33.73	13.12	1483.02	240.07	21.50	18120	25.68	26.93
79.47	46.01	46.98	12.74	1447.61	240.08	21.50	18300	29.71	30.33
60.08	54.32	54.88	11.75	1356.67	240.12	21.46	18750	28.29	28.58
40.23	61.31	61.56	10.42	1211.03	240.18	21.42	19290	23.95	24.05
18.93	68.86	68.92	9.13	1049.06	240.23	21.40	20130	14.61	14.63
4.25	73.22	73.22	8.10	919.34	240.28	21.38	20850	3.98	3.98
131.42	0.29	2.95	13.89	1480.19	230.20	21.48	18090	0.30	3.08
119.60	13.36	15.57	13.90	1489.21	230.35	21.43	18090	12.63	14.71
100.36	32.29	33.85	13.83	1470.77	230.21	21.38	18120	25.91	27.16
80.13	45.44	46.43	13.77	1436.62	230.22	21.36	18270	29.80	30.45
60.04	54.20	54.76	13.14	1348.07	230.25	21.34	18720	28.38	28.68
40.04	61.54	61.79	11.28	1207.03	230.29	21.31	19320	24.00	24.10
20.19	67.97	68.03	9.64	1041.73	230.35	21.30	20010	15.48	15.50
5.20	71.88	71.88	8.45	900.50	230.40	21.27	20580	4.88	4.88
131.09	0.37	3.02	14.79	1467.12	220.20	21.32	18060	0.39	3.17
119.92	12.94	15.15	14.77	1465.72	220.20	21.27	18060	12.44	14.57

99.67	32.62	34.15	14.73	1459.03	220.20	21.22	18090	26.19	27.42
80.06	45.49	46.47	14.53	1429.62	220.21	21.20	18270	29.94	30.59
58.41	54.33	54.85	13.54	1316.88	220.25	21.20	18690	28.32	28.59
40.13	61.09	61.34	11.75	1189.67	220.29	21.18	19230	24.22	24.32
20.85	67.44	67.51	9.91	1032.96	220.35	21.13	19920	15.99	16.01
4.11	72.18	72.18	8.53	876.60	220.41	21.08	20580	3.98	3.98

131.52	0.29	2.95	16.05	1411.52	180.21	21.14	18090	0.32	3.24
120.65	12.65	14.90	16.05	1411.82	180.29	21.10	18090	12.71	14.96
98.83	33.57	35.08	15.99	1400.00	180.20	21.09	18150	27.85	29.10
79.67	45.90	46.87	15.86	1368.84	180.22	21.05	18300	31.38	32.05
60.85	52.92	53.49	15.42	1267.59	180.36	21.05	18540	29.85	30.17
40.49	60.99	61.25	14.85	1154.72	180.32	21.01	19230	25.12	25.22
19.98	67.11	67.17	12.13	985.69	180.39	21.00	19860	15.98	16.00
4.09	71.89	71.90	9.72	839.63	180.45	20.95	20520	4.11	4.11

132.80	0.46	3.18	18.48	1480.51	133.78	20.96	18330	0.49	3.35
120.48	14.31	16.55	18.47	1477.35	133.77	20.91	18330	13.71	15.85
100.47	31.97	33.53	17.91	1410.11	133.80	20.85	18120	26.75	28.05
80.67	45.27	46.27	17.67	1382.22	133.82	20.85	18300	31.02	31.71
61.09	54.13	54.70	16.97	1301.02	133.88	20.85	18780	29.84	30.16
40.93	61.19	61.45	15.63	1146.13	133.97	20.82	19320	25.66	25.76
19.49	68.24	68.30	13.89	965.82	134.08	20.80	20070	16.17	16.18
5.03	72.60	72.60	11.89	832.06	134.14	20.75	20700	5.16	5.16

129.30	0.06	2.64	18.22	1350.64	120.02	20.81	17760	0.07	2.97
120.41	10.32	12.55	18.23	1349.98	120.02	20.74	17760	10.80	13.14
101.86	28.52	30.12	18.19	1344.35	120.02	20.72	17820	25.37	26.79
78.91	44.14	45.10	17.92	1314.75	120.04	20.68	18000	31.10	31.77
58.91	53.11	53.65	17.14	1235.22	120.08	20.66	18510	29.73	30.03
39.89	61.00	61.25	16.08	1125.17	120.16	20.64	19260	25.38	25.48
20.34	68.45	68.51	14.68	987.67	120.25	20.60	20190	16.54	16.56
4.24	74.45	74.45	13.19	858.16	120.33	20.57	21120	4.32	4.32

113.50	0.16	2.14	14.72	892.32	100.10	20.47	15540	0.24	3.20
100.16	12.66	14.21	14.77	894.30	100.11	20.44	15570	16.63	18.66
80.99	28.26	29.28	14.71	890.88	100.09	20.43	15570	30.14	31.22
59.01	38.43	38.97	14.02	842.79	100.13	20.43	15900	31.56	32.00
40.15	45.23	45.48	12.97	763.93	100.18	20.40	16440	27.88	28.04
20.05	52.31	52.37	11.74	663.55	100.26	20.36	17280	18.53	18.55
3.63	58.35	58.36	10.45	570.53	100.34	20.30	18150	4.35	4.36

VACUUM SHEET

Auto Populated don't change

Voltages Tested To

WP057BH2-0N18A-0001	264	V	
WP057BH2-0N18A-0001	240	V	
WP057BH2-0N18A-0001	230	V	
WP057BH2-0N18A-0001	220	V	
WP057BH2-0N18A-0001	180	V	
WP057BH2-0N18A-0001	134	V	
WP057BH2-0N18A-0001	120	V	
WP057BH2-0N18A-0001	100	V	
WP057BH2-0N18A-0001	0	V	

WP057BH2-0N18A-0001	Vacuum	vs.	Flow

APPENDIX O-C
OM&M LOGS

P.W. GROSSER CONSULTING, INC.
P.W. GROSSER CONSULTING ENGINEER & HYDROGEOLOGIST, P.C.
PHONE: 212.786.7420
PWGROSSER.COM
ONE PENN PLAZA, 36TH FLOOR
NEW YORK, NY 10119
LONG ISLAND • MANHATTAN • SARATOGA SPRINGS • SYRACUSE • SEATTLE • SHELTON

Inspector's Name: _____ Inspection Time: _____

Inspection Date: _____ Weather Conditions: _____

YES	NO	
☐	☐	Are any Low Vacuum Alarms on? Check BMS status of alarm.
☐	☐	Are the Low Vacuum Alarms functioning? Check BMS status of alarm through testing.
☐	☐	Are the vacuum monitoring points accessible?
☐	☐	Are the vacuum monitoring points properly secured?
☐	☐	Are there any cracks, gaps, holes, penetrations, etc. observed in the building slab/vapor barrier?
☐	☐	Any visual damage to piping?
☐	☐	Are Fantech® Rn4EC Fans on?
☐	☐	Are sample ports/vacuum gauges in good condition?

Vacuum Monitoring Points

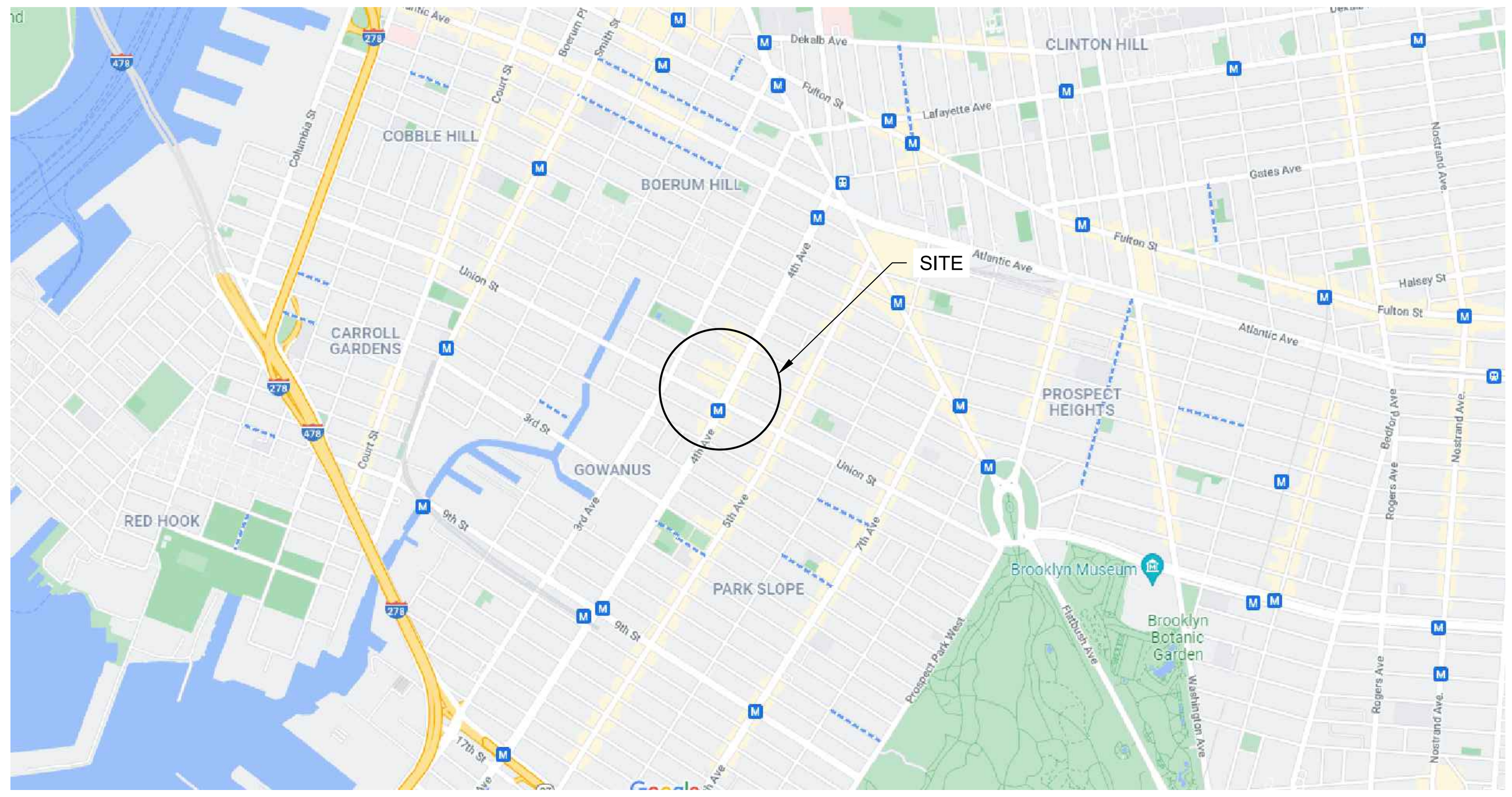
Monitoring Point ID	Vacuum (" WC)	PID (ppm)	Notes
VMP-1			
VMP-2			
VMP-3			
VMP-4			

Comments: _____

_____

Maintenance Items: _____

P.W. Grosser Consulting, Inc. • P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Ave., Suite 7 • Bohemia, NY 11716
PH 631.589.6353 • FX 631.589.8705 • www.pwgrosser.com
New York, NY • Syracuse, NY • Shelton, CT



VICINITY MAP

NOT TO SCALE

Scope of Work

INSTALLATION OF THE SUB-GRADE COMPONENTS OF AN ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) AND VAPOR BARRIER SYSTEM AT 204 4TH AVENUE, BROOKLYN NEW YORK AS SHOWN ON THESE PLANS. THE BUILDING IS APPROXIMATELY 19,000 SF.

THE WORK INCLUDES:

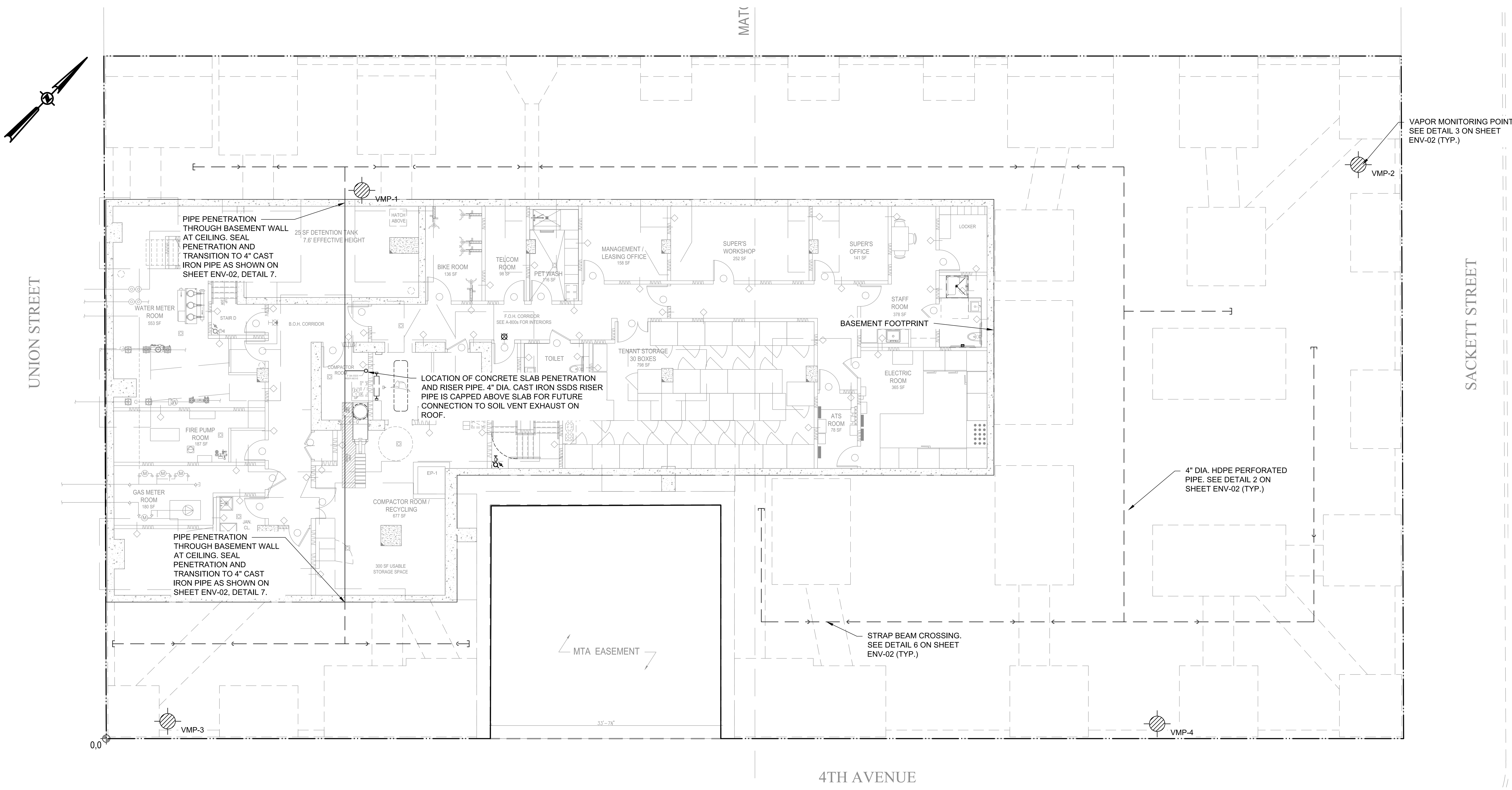
1. INSTALLATION OF PERFORATED PIPING AND VAPOR MONITORING POINTS.

Legend

— — — —	SLOTTED HDPE PIPING
VMP-#	VAPOR MONITORING POINT
—— · · ——	SOIL COVER EXTENTS

General Notes

1. GRAVEL 3/8" - 1/2" CLEAN CRUSHED STONE MEETING THE SPECIFICATIONS OF SIZE #6 AS DEFINED BY ASTM C33.
2. LOCATION OF RISER COORDINATED WITH ARCHITECT.
3. ALL CONCRETE PENETRATIONS ARE SEALED WITH LIQUID BOOT TROWEL GRADE. SEE DETAILS 7 & 8 ON SHEET ENV-02.
4. THE RISER PIPE HAS BEEN CAPPED FOLLOWING THE PENETRATION THROUGH THE BASEMENT WALL. THE ABOVE-GRADE COMPONENTS OF THE SSDS WILL BE INSTALLED PER THE DESIGN DRAWINGS AT A LATER DATE.



SUB-SLAB DEPRESSURIZATION PIPING AND SITE COVER AS-BUILTS

SCALE: 1-1/2" = 1'-0"

REFERENCE:

1. BACKGROUND DRAWING PROVIDED BY L+Z ARCHITECTURE ON 8/16/22.

PWGC

CLIENT DRIVEN SOLUTIONS

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	PRELIMINARY DESIGN DEVELOPMENT	3/31/2023

Designed By	WSH	Date Submitted	
Drawn By	WSH	Date Created	
Approved By	S	Scale	AS NOTED

Client:
AVERY HALL
51 E 12TH ST., 7TH FL
NEW YORK, NY 10003

Project:
SITE COVER AND ACTIVE SSDS AS-BUILTS

Project Address:
204 4th Ave.
BROOKLYN, NY

County Tax Map Number:

Contract Number: 1

Regulatory Reference Number:

Title of Drawing:

SITE COVER AND ACTIVE SSDS AS-BUILTS

Drawing Number: ENV-01

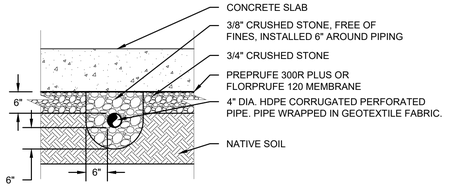
Sheet 1 of 2

PWGC Project Number: AHI2005

STATE OF NEW YORK · ERIK JOSEPH DEE-OLSEN · 088835 · LICENSED PROFESSIONAL ENGINEER

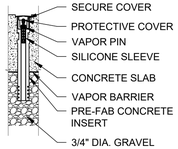
Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

PWGC FILE NAME: J:\Projects A-D\AHI2005 - 204 4th Ave - Remedial Action\SSDS Design\CAD\2023.06.28_AHI2005_SSDS Design_As-Builts_12072023.dwg (ENV-01)
PLOT DATE/TIME: Dec 07, 2023-4:46pm By: hdehaas
PLOT STYLE: [----; [ENTER COLOR/LINE WEIGHT EXCEPTIONS HERE]



1 - PERFORATED SSDS PIPE DETAIL

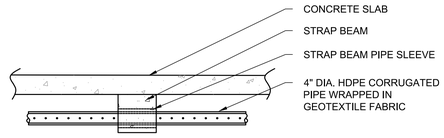
SCALE: NOT TO SCALE



NOTES:
1. BASIS OF DETAIL
   MAKE: VAPOR PIN ENTERPRISES, INC
   MODEL: VAPOR PIN
2. INSTALLED PER MANUFACTURER'S INSTRUCTIONS

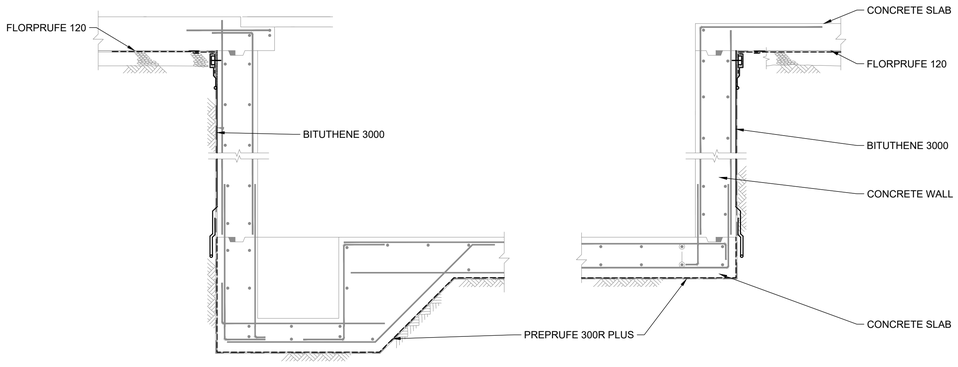
2 - MONITORING POINT DETAIL

SCALE: NOT TO SCALE



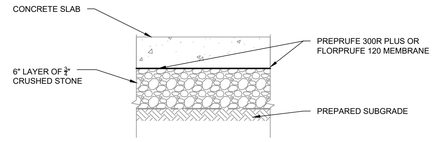
3 - SSDS STRAP BEAM CROSSING DETAIL

SCALE: NOT TO SCALE



4 - TYPICAL INTERIOR/EXTERIOR BASEMENL WALL, ELEVATOR PIT, AND SUMP PIT DETAIL

NOT TO SCALE



5 - TYPICAL SITE COVER DETAIL

SCALE: NOT TO SCALE

PWGC
CLIENT DRIVEN SOLUTIONS
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630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

CONSULTANTS

Number	Revision Description	Revision Date
7		
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5		
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2		
1	PRELIMINARY DESIGN DEVELOPMENT	3/31/2023

Designed By: WSH | Date Submitted:
Drawn By: WSH | Date Created:
Approved By: EDO | Scale: AS NOTED

Client:
AVERY HALL
51 E 12TH ST., 7TH FL
NEW YORK, NY 10003

Project:
SITE COVER AND ACTIVE SSDS AS-BUILTS

Project Address:
204 4th Ave.
BROOKLYN, NY

County Tax Map Number: | Contract Number: 1
Regulatory Reference Number:

Title of Drawing:

SSDS AND SITE COVER DETAILS

Drawing Number:
ENV-02

Sheet 2 of 2

PWGC Project Number:
AHI2005

APPENDIX J

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR 204 4th Avenue, Brooklyn, New York

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1.0 INTRODUCTION
1.1 SITE OVERVIEW
1.2 PROJECT OBJECTIVES AND SCOPE OF WORK
1.3 REPORT OVERVIEW
2.0 REMEDIAL ACTION DESCRIPTION
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2.2 REGULATORY HISTORY AND REQUIREMENTS
2.3 CLEAN-UP GOALS AND SITE CLOSURE CRITERIA
2.4 PREVIOUS REMEDIAL ACTIONS
2.5 DESCRIPTION OF EXISTING REMEDY
2.5.1 System Goals and Objectives
2.5.2 System Description
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3.0 FINDINGS AND OBSERVATIONS
3.1 SUBSURFACE PERFORMANCE
3.2 TREATMENT SYSTEM PERFORMANCE
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4.1.2 Sampling
4.1.3 Conceptual Site Model (Risk Assessment)
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4.2.1 Maintenance Improvements
4.2.2 Monitoring Improvements
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4.3 RECOMMENDATIONS TO REDUCE COSTS

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4.3.3 Optimize Monitoring Program

4.3.4 Maintenance and Repairs

4.4 RECOMMENDATIONS FOR IMPLEMENTATION

APPENDIX K

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) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

Revised April 2023